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PHARMACEUTICAL JOURNAL

AND

TRANSACTIONS.

VOLUME XIV.

1854–55.

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THE PHARMACEUTICAL JOURNAL.

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THE PROGRESS OF THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

Every stage in the progress of this case shows in a stronger light the recklessness and inutility of the proceedings, from which the only parties who can by possibility derive any benefit, are the lawyers. The question at issue is now divested of much of its intricacy, and has been resolved into a dry, hard, attenuated point of law. The facts with regard to the registers are proved or admitted on both sides. It has been proved that the Registrar has performed his duty according to instructions received from the Council, over whose decisions he has no control. The register of the Members is no longer a matter of dispute, nor is it denied that the Council possess the power of placing or causing to be placed on the register of Members, the names of all those persons whom they have elected as Members, under the bye-laws made and established as the Act directs, in accordance with the provisions of the Charter. The bye-laws themselves are also admitted as a part of the special verdict.

The question to be decided is simply this—whether the names of certain persons, who have been duly elected as Members since the passing of the Act, have been legally placed on the register of Pharmaceutical Chemists? This is the grave question which occupied the attention of the learned judge, six learned barristers, four learned solicitors, and twelve special jurymen, in the Court of Queen's Bench, on Thursday, the 22nd of June, and which will occupy the attention of the four learned judges in the same court on a future day.

To persons uninitiated in the refinement of legal technicalities, the case, considered on its merits, appears a plain and simple one. We have on one side (in round numbers) about 2000 persons, who, having been Members of the Society of Pharmaceutical Chemists at the date of the Act, are, by a special provision in the Act, required to be registered as Pharmaceutical Chemists. On the other side, we have about 1000 persons subsequently elected Members of the same Society on the same terms and conditions, and on producing the same evidence of qualification, with this addition, that their certificates are more explicit, and most of them are verified by three signatures instead of two.

These latter persons are not specially referred to in the Act, but the omission is supplied in bye-laws, some of which were confirmed by the Act, and others subsequently made and confirmed as the Act directs. The Act, moreover, requires the Registrar to make and maintain from time to time a complete register of all persons being Members, Associates, Apprentices, or Students, respectively, according to the terms of the Charter of Incorporation, and such other registers as may be *required by the Council*, and may be necessary *for giving effect to the bye-laws of the Society and the provisions of the Act.* According to the provisions of the Act, certain registers are to be kept and maintained, containing the names of all persons possessing certain qualifications. The qualifications of the recently-elected Members are the same as the qualifications of those who, having been Members at the date of the Act, are by special provision ordered to be registered as Pharmaceutical Chemists. They have been duly elected as Members of the Society of Pharmaceutical Chemists, the validity of their election is not disputed, and as no persons except Pharmaceutical Chemists can be Members of

the Society, the register of Pharmaceutical Chemists would not be a complete register, as required by the Act, if it did not contain the names of all the Members. The case, therefore, as stated by Sir Fitzroy Kelly, rests on a distinction which, apart from legal technicalities, is a distinction without a difference. The legal technicality is this—The Act provides (sec. 6th) that all persons being Members at the date of the Act, shall be registered as Pharmaceutical Chemists, and also (sec. 10) all persons who shall have passed the Examination. It indirectly sanctions (*by the Charter and bye-laws*, sec. 1 and 2) the election of Members on certificate of qualification without Examination, but it omits to state *in the text* whether the Members so elected shall or shall not, in common with the other Members, be registered as Pharmaceutical Chemists, in other words, whether the Council shall or shall not have the power of recovering penalties from Members of the Pharmaceutical Society for assuming the name of Pharmaceutical Chemists! ! !

It might have been supposed that the Members could settle such a question among themselves, without expending a thousand pounds in litigation, and wasting the time of the Court of Queen's Bench.

To the legal gentlemen retained by the contending parties, it matters not what may be the magnitude or the frivolity of the question at issue. It is their professional duty to grapple with any subject which their clients may bring before them—whether the question in dispute relate to a contested earldom, or to the *legal* difference between "tweedle-dum and "tweedle-dee": but when we heard Sir Fitzroy Kelly explaining to the Court, without even a smile on his countenance, the distinction between a *Pharmaceutical Chemist* and a *Member of the Society of Pharmaceutical Chemists*, we were forcibly reminded of the celebrated elephant who could, with the same prehensile organ, tear up an oak from its roots or pick up a pin.

A Chemist might in the exercise of his professional skill perform a similar feat of microscopic dexterity with equal gravity.

By way of illustration, we may imagine a Company formed for the supply of the public with pure water. Samples of the water proposed to be furnished are placed in the hands of several eminent Chemists, who, after the requisite examination, present a report recommending the water as suitable for the purpose intended. One of the Directors enters into a dispute with his colleagues and takes samples of the water to certain other eminent Chemists, with instructions to furnish evidence of its impurity. By the aid of delicate chemical tests, and a powerful microscope, it is found to contain traces of alkaline salts and minute particles of organic matter, proving that, *in a chemical sense*, it is not pure. It is admitted that for all practical purposes these slight impurities are of no importance whatever, and that the water is far superior to that which has hitherto been supplied to the public. All the Chemists consulted agree as to these facts, and yet so long as the Directors think proper to waste their money and their time in this fruitless controversy, they will find Chemists ready and willing to analyse the water, take the fees, and prove that it is either pure or impure, according to the sense in which they are instructed to use the term purity—whether in the *chemical* sense, which denotes absolute purity, or according to *common* sense, which means the nearest approach to purity which is practically attainable. During the continuance of the dispute, which is profitable only to the Chemists employed, the proceedings of the Company are delayed, and the public thereby deprived of the advantage of the contemplated improvement in the quality of the water supplied for domestic use.

This is an appropriate illustration of the drama now in course of performance in the Court of Queen's Bench. The legal advisers of the Society taking a practical view of the subject referred to them, and considering the bye-laws in relation to the purposes contemplated by the Charter and the Act, sanctioned and directed the proceedings of the Council with a view of carrying into effect

the purposes so contemplated. The opponent, discarding all considerations of practical utility, and having discovered what he conceived to be a flaw in the Act, instructed his legal advisers to apply the most severe legal tests and microscopic powers, with a view of magnifying and developing the supposed obstacle to the completion of the purposes contemplated. The progress of the Society has thus been retarded, and much time wasted in the discussion of a point of law, which neither the ends of justice nor the interest of the public required to be raised.

Lord Campbell considers it a very important case, and one which ought to be decided in such a manner as to be free from technical objections.

On a *primâ facie* view of it, as stated on behalf of the prosecution, the charge against the Registrar and the Council is undoubtedly a serious one. It is that of illegally placing the names of several hundred unqualified persons not deserving of the public confidence on a register purporting to contain only the names of qualified Pharmaceutical Chemists. Had this been a correct version of the facts it would have been difficult to rebut or extenuate the charge; but it is not so. The real merits of the case have not been fully explained in the Court of Queen's Bench. The purposes contemplated by the Charter and the Act have only been referred to in general terms, and no allusion has been made to the *modus operandi* of the Act in effecting these purposes, the *necessity* of the bye-laws for supplying that which would otherwise have been a serious defect in the Act, the *discretionary power* vested in the Council in making such bye-laws *as they may deem proper and necessary*, and the almost unanimous approval by the Members of the manner in which the Council have exercised this discretionary power. No direct evidence has been produced respecting the qualifications of the new Members as compared with the qualifications of those referred to in the sixth section of the Act. The purpose for which the prosecution was commenced has not transpired, and although this is foreign to the legal question at issue, yet, in stating a case to a jury, it is not altogether an unimportant fact (taking into consideration the discretion vested in the Council by the Act), that the proceedings of the parties attacked have been conducted honestly and under legal advice, with a view of carrying out in the most effectual manner the purposes contemplated by the Charter and the Act, while the prosecution is simply an act of retaliation against the Council on the part of a Member who was threatened with expulsion from the Society for abusive language and factious opposition to the decisions of the Members at large. It may be a matter of surprise to our readers that the real merits of the case were not fully laid before the special jury, but we presume this was considered unnecessary, on account of the admissions, which, having settled the matters in dispute with regard to the keeping of the registers, the passing of the bye-laws, and the election of the Members, reduced the question at issue to a mere legal technicality.

We admire the discretion of Sir Fitzroy Kelly in making these admissions, however unfavourable in some respects to the case of his client, as he, by so doing, avoided an exposure which might have proved more unfavourable than the admissions.

We also admire the commentary in the *Times* of June 23rd, which mentions, as the only matter of importance in the case, the decision as to the proper pronunciation of the word Pharmaceutical.

Our own reporter omitted to take a note of this episode; we therefore extracted it from the *Times*, and appended it to our Report of the case, which will be found in another part of this number.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES

ELECTED FROM FEBRUARY TO JUNE.

MEMBERS.

Alford.....Robinson, Levi
Bath .....Knight, Joseph
Bewdley.....Newman, Robert
Blandford.....Groves, Wellington E.
Bodmin .....Williams, Joel D.
Chester .....Farrer, John D.
Dunfermline ...Seath, Alexander
Havant .....Bannister, Edward
Hull.....Metcalfe, Christopher L.
Leeds .....Reynolds, Richard
London .....Carrick, James
Coles, Charles
Phillips, John
London .....Skidmore, John
Stocken, James
Maidstone .....Kirk, John
Monmouth .....Dawe, Sampson
Newcastle .....Hall, Thomas
Norwich .....Wheeler, Francis
Nottingham ....Rayner, John
Penzance .....Symons, John N.
Peterborough....Babington, Christopher
Rochester .....Porter, William H.
Southminster...Hopewell, Edward
Ventnor .....Littlefield, James W.

MAJOR EXAMINATIONS.

*Anness, Samuel R. .....Hadleigh
*Bishop, Alfred ....Ludlow
*Butler, John Symes .....Frome
*Chapple, Edwin.....Bideford
*Christopher, James .....Crickhowell
*Davies, William J. .....Shrewsbury
*Dixon, William.....London
*Handley, John .....Leeds
*Jones, Hugh L. .....Chester
*Lavington, Edwin.....Wells
*Prosser, Evan T. .....Cardiff

MINOR EXAMINATIONS.

*Clayton, George A. .....Shrewsbury
*D'Oyle, John .....London
*Dyer, Alfred K.....London
*Lomas, Joseph W.....London
*Long, Henry .....London
*Longstaff, Thomas .....Sunderland
*Stewart, Charles J. .....London

NOTE.—The asterisk (*) employed to denote Honorary Certificates will henceforth be discontinued, as Candidates not attaining such a standard of qualification will not pass the Board of Examiners.

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH.	TOWNS.
Barnes, Edwin M.	Mr. Morton	Durham
Beach, Wesley	Mr. Beach	Bridport
Bingley, Frederick B.	Mr. Tanner	Exeter
Burton, Joseph	Mr. Wick	Sheffield
Cozens, William	Mr. May	Reading
Fidel, Albert J.	Mr. Telfer	Oxford
Ham, Charles	Mr. Foster	Collumpton
Horn, William	Mr. Longrigg	Appleby
Humphreys, Henry A.	Mr. Grounds	Ludlow
Matthews, Charles	Mr. Gostling	Diss
Reeves, Robert	Mr. Gordelier	Sittingbourne
Slater, Henry	Mr. Asling	Spalding
Thomas, Stephen G.	Mr. Orithwaite	Bradford
Wood, John R.	Mr. Simonds	Boston

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

The Board of Examiners for Scotland will meet for the Examination of Members, Associates, and Apprentices, in the Society's Rooms, 72, Princes Street, Edinburgh, on Wednesday, 12th July, at eleven o'clock in the forenoon.

Parties intending to be present are requested to intimate the same to the Secretary, 121, George Street, ten days before the day of meeting, and also to forward him particulars regarding previous studies and qualifications.

John Mackay, *Secretary.*

Edinburgh, 15th *June*, 1854.

ORIGINAL AND EXTRACTED ARTICLES.

EDUCATION *versus* TRADE.

BY MR. JOSEPH INCE.

The examination of a school upon some patent principle is one of the ordinary sights of London, almost a too familiar scene to need description. There stand the boys drawn up in appropriate phalanx, unusually clean and silent, while there the anxious faces of the girls betray the galvanic pitch to which they have been wrought up for the occasion. Of the boys we say nothing, but devote our sole attention, as in duty bound, to the young ladies. The Government Inspector has come down upon them like the wolf on the fold, and the mistress depends on his approving smile whether she may receive three pupil teachers and thirty pounds additional. The casual lady-visitor, educated in the good old times, when systems as the Glasgow, Borough Road, Westminster, or National were unknown, is lost in wonder, whilst a little girl, not much higher than the form she sits upon, details with faultless accuracy her views upon Comparative Zoology, and is deep in the mysteries of Quadrumana. Quick as thought a class goes through a course of Mental Arithmetic, and shows if an odd number of things at a fractional price came to an amount you couldn't remember, how much would another odd number, at a different fraction, come to?

Variety is charming, so the teacher *takes them on* Geography. Forthwith comes the catalogue of rivers, mountains, valleys, capitals, and the whole selection of useful knowledge, that is usually forgotten after leaving school. History receives its due, Ancient, Modern, and Sacred; but the grand climax, the English Ultimatum, is without question, Grammar. Not your common Lindley Murray, but a refined arrangement based upon the science of language, which depends upon the subject, copula, and predicate, with other enigmas easily discovered by reference to any government manual. Happy is the word rejoicing in its simple Saxon origin, derived from neither Latin, Greek, or French, its only guarantee to peace and quietness; for what school-girl of this century does not know that reference is derived from *re*-back, and *fero* I bring; government from *gouverner*, and manual from *manus*. Now what are these poor children meant for? Surely such a system, with its new tastes, habits, and refinement; its range of subjects, and even with its superficial science, is intended to fit them for the higher walks of life; but the astonishment of the visitor is at its height on discovering that it is to make them, what they never will be, household servants. We suggest to the accurate pencil of the Pre-Raphaelites the subject of the model housemaid, with her broom in one hand and her Geography in the other, mechanically sweeping the carpet, and mentally the surface of the globe. Helpless personage! she can neither sew, nor buy, bake, brew, manage, cook, or wait at table. Education some years ago was at a stand-still—now it has gone mad; but the day will come when reason will regain her throne, and sensible plans be adapted to right ends.

It has been said that the Pharmaceutical Society entails the same melancholy consequences, namely, that by refining upon education it unfits its admirers for the ordinary routine of business; that no one so trained can possibly become a good Assistant or a successful Master. His inclinations will be at warfare with his trade. Conversazionis, meetings, chemical researches, diligent reading, and practical experiments will tend to enlarge his mind and shut his shop.

The fallacy is here; while in some public establishments an exclusive attention is given to pursuits in themselves at variance with eventual duties, in the present instance mental cultivation is the mainspring of success hereafter—business itself depends upon the constant application of the facts acquired; ignorance is here not bliss, but ruin. Some years ago houses of great reputation were select and few, there are more now for definite reasons. The secret of such reputation has been in every case the same; their owners knew far more than their business, bringing to bear on daily details the results not only of experience, but scientific skill. No sophistry can set aside this fact. Let a man with a self-fatal casuistry once persuade himself to the contrary, and the result is sure; a doubtful mediocrity will be his highest prize—the world and all that is within it will roll on without him. A river is a pleasant sight, old men and children like it (and there must be something real in whatever unites the sympathies of both ends of life). Nevertheless, a man wise in his generation, places a wheel midway in its course; that wheel supports the industry of ages, and yet the river sparkles on as ever. Science is the wheel over which the wise Chemist lets the tide of business roll: the same science that charms the Royal Institution, keeps his wife and family, pays all his debts, and works the world's prose into the poetry of home enjoyment. Applied talent constitutes success.

The question involves a minor fallacy. Not even Hufeland's *Art of Prolonging Life* can keep men from the grave for ever. A new generation carries on the labours of the past. There is the shop with its bottles, drugs, and ready-made reputation. Customers roll in, orders multiply, while carriages with titled occupants wait at the door. No need of education here! exclaims the fortunate successor; what has been will be. No it won't. The skill that raised the place from nothing must sustain it, or it will prove another version of the Coming Struggle, and fall like Lucifer, outshone by other lights.

Although it may be possible for an old establishment to linger on, supported by its previous fame, the directing energy of a well-educated mind is the commencer's solitary hope. What earthly prospect is there else among the blaze of endless competition? We have a theory that a shoemaker not only should make boots and shoes, but be a judge of leather; that a wine merchant should be competent to choose his wines; a baker be a connoisseur in flour; a tailor a good judge of cloth; a butcher able to select his beef and mutton; and we think also, though it is a hazardous assertion, that a Chemist might know something about his drugs.

There are philosophers amongst us who think otherwise, imagining that Science and the Gazette go hand in hand together. Why then do visitors from town rejoice in the fresh country air, but carefully avoid its physic, and would rather trust in a kind Providence than doubtful preparations? There is an excellent opening yet for any one who, having more faith in applied Chemistry than in Venetian Red, shall combine real knowledge and manufacturing ability with the usual occupations of a Pharmaceutist. But the Philosopher just mentioned knows much better—books are books, and trade is trade; he minds his shop while Dilletante sages talk; which, when translated into English, reads as follows: A. B. begs to assure the world that he has lately commenced upon his own account. He is a thoroughly practical man, who understands his business, and knows nothing.

Let us leave trade to say a few words about the traders. It is more than strange that those who would be most benefited by the education theory most neglect it. People in your great establishments are too well off to care much

for new sources of enjoyment, but it has been and still remains a constant mystery, why those innumerable small caverns, like a decayed surgery with rows of monumental bottles, have never let in upon themselves the healthful light, that would allure them for one moment from their pestles. We have often wondered by what law of endogenous life they can sustain existence. There are plants in the Kew Conservatories that flourish upon some principle Sir William Hooker could alone explain, being to all appearances independent of both soil and moisture. Great is the power of self-sustained vitality, but yet we must confess to a passing shudder, in reflecting on the slight barrier that must exist between the disheartening monotony of pills and draughts and Prussic acid. Canadian travellers tell us, that there is no sight in nature like the slave's leap as he first touches British shores, and knows that he is free; surely the emancipated Druggist must have felt a similar sensation when he first heard of a Society that rescued him from the shackles of mere drudgery, gave him the inspiration of books, lectures, and the amenities of study, and by a well-directed education linked him to the enlargement and common interests of humanity.

We have no intention of surrendering this view of the subject for the sake of a few young gentlemen who bring the same disgrace on Chemistry which they would on any other pursuit they might dishonour with their choice. There are indeed some in whose case a little pharmacy has proved disastrous—a crisis often hastened by some fortunate experimental hit, to which, perhaps, an innocuous course of botany, and a month's analysis has put the climax. Elated with the scarcely opened prospect they exchange the laboratory for business, and hate it with a perfect hatred. Hapless is the master who may chance to engage them, still more unfortunate the assistants with whom they may associate. Despising the details of the shop, yet by no means fitted for a higher sphere, like Mahomet's coffin hanging between heaven and earth, they are neither chemists nor philosophers: hankering always after something in the distance, but entirely oblivious of the duties that lie before them. There, says the exulting oppositionist, there is your education! What profit is it that a man should know how to distinguish the florets of the disc and the ray, when he should be making infusion of chamomile? Is it not better to serve the waiting customers with their Rochelle Salt instead of pondering the knotty question whether its crystalline system is equi or unequiaxed?

"It must be so, Plato, thou reasonest well."

The honest-minded, hard-working, self-denying band of students, as unassuming in deportment as assiduous in their pursuits, are not to be lightly thought of for the sake of *some* exceptions, nor are their earnest hopes to be offered up at the shrine of such an inflation, no more than the world's locomotion should be stopped, because an occasional upstart drives an engine and sends it down an embankment.

Another spectral form should be quietly put in its grave. Like the ghost in Hamlet it comes before us in a questionable shape, and asks—Is not this same Education an interference with Medical Men?

Every man in his own sphere, is entitled to his own proper honour; yet Chemists sometimes act, or at least speak, as if to compromise their individual independence were to pay the best tribute of respect to other people; the world is wide enough for all. If some Physicians look with jealousy (which we doubt altogether) on the attempts made by Druggists to enable them with better skill and more consequent success to carry out the views of the prescriber, the simplest method is to let them, but the idea is quite gratuitous, and disproved by every-day experience. Curious indeed is the peculiar line of mental argument adopted by some cautious reasoners. Let but a Druggist eke out his intermittent Pharmacy (whose dying embers are fanned into life by an occasional prescription) with an incursion into his neighbour's trade; let cigars and drugs

repose together; medicine and cheap literature shake hands, whilst tea and coffee make no discord in the happy union of innumerable sundries; censure itself withholds the faintest disapproval; the learned forager is thought a nice, clever, industrious young man, *who sticks to his business.* But let him in an evil moment steal one glance at Fownes's *Chemistry*, let him bestow a little thought on the inside of his elegantly gilded bottles; let him astound the native population by digging up his own Taraxacum, gathering his own herbs, making his own extracts, manufacturing his own chemicals, analysing his own soils, preparing his own physic, establishing his own wholesale trade, and keeping his own customers, who are not the less confident in him because now and then he reads a paper before a scientific meeting, and can converse in a rational manner about Dalton, Liebig, and Berzelius: why then the aforesaid cautious gentleman shakes his head, which he never ceases doing, until one fine morning our now rapidly rising Chemist passes him in his own brougham, leaving him to his speculations.

We suggest that medical men are infinitely more interfered with in their practice by weak preparations and ignorant dispensing than they can be with a well regulated, carefully-conducted shop, whose owner is himself personally acquainted with the objects that surround him; and we venture to assert, that Physicians have as great a horror of indiscriminate chemistry as the public. There is a danger, of course (the natural fault of all associations), of being too scientific about simple things, but this is an error on the right side, and one very easily remedied; but that educated men themselves should be frightened at the industry and advance of others, is absurd. Statements such as these are made so often, and repeated with such an air of authority, that by degrees they are believed. We like to place a subject in its own broad light: "shoot folly as it flies."

Deeply are we indebted to the generosity of those who, a few years ago, created for the new generation advantages which were to themselves unknown; yet some there always are, and have been, who, because they do not monopolize the respect of those around them, fancy the world worse than it was when they were young; for these are captious days, in which even Lord Burleigh might shake his head in vain.

Advance the age must, therefore the wisest plan is to march on with it. No, says the malcontent; coaches did well enough in my time, away with steam; oil was sufficient once to light our streets, put out the gas! I was a Chemist before Societies were dreamt of, and sold physic, glue, paint, brushes, powder and shot, oils, whitening, red, white, and black lead, umber, hemp seed, canary seed, tea, sugar and treacle, arsenic and oxalic acid, so shall my son; I lived on and knew nothing, no more shall he. Chemistry shall not distract his mind, reading shall not confuse him, research shall not contract his energies, still less shall companionship with learned and good men upset his business.

My excellent friend, good night. We sincerely hope the day will come when the Fahrenheit of chemical enthusiasm may rise to its proper height, and that some well-trained Pharmaceutist, with a diploma in his counting-house and sound knowledge in his head, may vindicate our notions of education and send our friend's theories into the heaven of heavens. There let him rest, like an old boatman sitting by his creaky vessel drawn up upon the beach-side high and dry and dismal, muttering vengeance on the thousands who are crowding on the glad waters, and are now sailing rapidly out of his sight in search of other lands, fresh gains, and new associations.

31, *Southampton Street, Covent Garden.*

ON *PE-LA* OR THE INSECT WHITE WAX OF CHINA, AND SPERMACETI.

BY DR. THEODOR W. C. MARTIUS.

The readers of this Journal will have noticed the interesting communication of Mr. D. Hanbury, on *Pe-la* or the insect white wax of China. A suspicion has existed among many persons that this remarkable substance was adulterated with other similar substances, the origin of which was different. *Pe-la*, when superficially observed, may be readily confounded with spermaceti, and possibly also with stearine. Upon first superficially examining a sample of *pe-la*, I was, myself, induced to consider it as a sort of spermaceti. It is well known that the whale fisheries are much more extensive on the coast of Japan than in the Chinese sea. Hence it seemed possible that the spermaceti thus procured furnished the so-called Chinese insect wax, and that this really takes its origin from the sperm whale. The communications of Mr. Hanbury, and of travellers who have witnessed the manufacture of *pe-la* in its native country, afford, however, a very different account of it. It appeared to me, nevertheless, important to ascertain whether the adulteration of *pe-la*, especially with spermaceti, could be detected by chemical means. I therefore made some experiments, the results of which I will here describe, with a few general remarks.

The tallow of the *Stillingia* is sometimes called *Chinese vegetable wax*, so that we have two distinct and different bodies confounded under this name. Thomson and Wood call Stillingia tallow *Chinese vegetable wax* without using any prefix; and M. Borck, who minutely describes not only the Stillingia tallow, but also the fruit of the tree, calls the former *Chinese wax*. The substance produced by *Flata limbata* has been supposed by some persons to be *pe-la*.

Lewy, who was the first who gave any chemical description of *pe-la*, describes it as a white, shining crystalline substance, which, he says, is of vegetable origin. In a later communication from the same chemist, he describes it as having the crystalline appearance of spermaceti.

Dr. Ure, who examined *pe-la*, says it has the brilliancy and texture of spermaceti.

Brodie, whose analysis is mentioned by Mr. Hanbury, describes it very accurately. He says it is in large white lumps and very crystalline, like spermaceti, but much harder, more fragile, and possessing a more fibrous character than spermaceti.

The crystalline appearance is a very marked character in the insect wax of China. If the *pe-la* be long exposed to the air it acquires a dirty yellowish colour, but by digesting this in cold ether it is restored to a snow-white colour. I have only further to add that there is much difference of opinion respecting the insect (*Coccus pe-la*, West.) supposed to produce the *pe-la*,* and that it is a remarkable fact that this substance was not introduced into London in any quantity until 1852, although it has been known in Germany for some time.

The following experiments were made with the view of determining the difference between pe-la and spermaceti.

The spermaceti employed was taken from the mass exhibited at the Crystal Palace in 1851 by Mr. Miller, which was the finest I ever saw.

In all the experiments one scruple of the powdered substance was added to half an ounce of the liquid, the temperature of the room varying from 59° to 64° F.

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* [There appears no ground for a difference of opinion regarding Mr. Westwood's *Coccus pe-la* (*C. Sinensis in Pharm. Journ.* vol. xii., p. 478), the specimens of which, figured by him in the *Gardeners' Chronicle* (Aug. 20, 1853), were actually taken out of the crude wax furnished him by Mr. Hanbury; and *this* crude wax, when melted and strained, afforded a substance in every respect identical with the *Pe-la* of commerce.—ED. *Pharm. Journ.*]

Spermaceti.	Pe-la.
Very white. Entirely crystallized in laminæ. Difficultly rubbed to powder, and caking under the pestle.	Brilliant, like spermaceti, the outside portion being a little yellowish. Easily rubbed down to coarse powder, without caking under the pestle.
Melting Points.	
Melts at 122° Fahr., and in melting emits a smell peculiar to spermaceti.	Melts at 181° Fahr., and in melting smells like wax mixed with tallow.
Ether	
Dissolves the spermaceti after shaking them together a few times. On reducing the temperature of the liquid to 27° Fahr., it solidifies, white leafy crystals being formed, which are redissolved on slightly raising the temperature. A few drops evaporated to dryness, and viewed through a glass magnifying 300 times with polarized light, it presented a partly crystalline mass, having a bluish tint.	Seems to have very little influence on *pe-la*, which remains on the top of the liquid as a powdery mass. Upon the temperature being reduced to 27° Fahr., no change takes place. After boiling the ethereal liquor and allowing it to cool, only a slight precipitation occurs. The liquid being filtered and then evaporated, left a small quantity of a slightly yellow powder. Viewed through a glass magnifying 120 times, some needle-like crystals could be detected in the stratum of deposit. When examined with polarized light, the whole appeared white.
Spirit of Wine (sp. gr. 0.837).	
Alcohol seemed to have no influence in the cold. Upon applying heat, the spermaceti melted, floating in large drops upon the surface. On being allowed to cool, acicular crystals were formed, and pieces of the spermaceti settled to the bottom. The liquid was filtered at 30° Fahr., and a portion evaporated to a few drops, which, upon cooling, deposited some irregular crystals, which were detected with a glass magnifying 120 times.	It was only after long boiling that an alteration could be effected in the appearance, when the smaller lumps began to unite, forming larger ones. After cooling, there were some small white flakes above the lumps. The liquid was filtered at 27° Fahr., and a portion evaporated to a few drops which had a yellowish colour, and this on cooling deposited some *pe-la*. Examined with a glass magnifying 120 times, no crystals could be observed in the deposit.
Rectified Oil of Turpentine	
Dissolved the spermaceti immediately. At a temperature of 27° Fahr., the solution became thick but transparent. At 10° Fahr., a separation took place, the solid mass adhering to the bottom. During the night, the temperature being 41° Fahr., some fine acicular crystals separated, but the whole mass was transparent. The crystals, viewed by a polariscope with a magnifying power of 300, were of a light blue colour.	Appeared to have no influence at common temperature, but when heated to 158° Fahr., a perfect solution was formed. Upon cooling, the whole became solid like tallow. It was white and not transparent, and none of the turpentine separated. A portion of the mass which adhered firmly to the vessel was heated to between 86° and 96° Fahr., and viewed with a glass magnifying 300 times, but no crystals could be seen. When viewed by polarized light, it was colourless.

Rectified Petroleum.

The pieces were perfectly dissolved at the temperature of the room, after being frequently shaken. At 21° Fahr. some crystals were formed. At 43° Fahr., it was partially solidified but transparent, and a portion of the petroleum separated. A few drops of the separated petroleum, on being evaporated, left a little crystalline cetaceum, presenting the blue appearance when viewed by polarized light.

After being shaken together, the oil became turbid, but there was no other evidence of action. It was only at a temperature of 140° Fahr. that solution took place, and then it was not clear like that of spermaceti. At 21° the solution became solid, white, and not transparent. At 122° liquefaction took place, but the turbidity still continued. At 110° it began to solidify, and at 104° it became quite solid. A portion left to free evaporation, appeared white in the polariscope.

Rape Oil.

The solution took place at a low temperature.

A much higher temperature was required for its solution. When cooled, it seemed to be a little harder if tried with a glass rod, and it remained solid up to 122°, and was only liquefied at 158°.

From these experiments it will be seen that the easier solubility of spermaceti in ether, in oil of turpentine, and in petroleum, serves to distinguish it satisfactorily from *pe-la*. But in addition to this, spermaceti has a much lower melting point, and when seen through the polariscope presents a blue colour, a property which *pe-la* does not possess. Even if *pe-la* should be mixed with spermaceti they may easily be separated by digesting them in cold oil of turpentine. Spermaceti being more expensive than *pe-la*, the latter could easily be used to adulterate the former.

In Mr. Hanbury's paper it is mentioned that *Flata limbata* has been assumed to be the insect producing *pe-la*; but according to Burmeister (*Handbuch der Entomologie* ii., p. 466) this insect only inhabits Western Africa. Besides, *Cicada limbata*, Donovan (*Flata Nigricornis*, Fabr.), is a native of China, and its caterpillar is stated to live on *Stillingia Sebifera;* to be entirely covered with a white down, which remains upon the leaves, and which, when melted, forms the *pe-la*. In the last edition of Pereira's *Materia Medica* (vol. ii., p. 2220) there is a wood-engraving giving a good idea of this insect.

The statements of Westwood and Quekett, however (*Pharmaceutical Journal*, vol. xii., p. 482), that *Coccus Sinensis* produces *pe-la*, renders the above statement very doubtful. Besides, it is stated that the white substance above referred to is washed away by the dew and the rain, whereas *pe-la* is well known to be insoluble in water. I suspect that *Flata limbata* exudes a sugary substance—a kind of manna Helbig (*Miscellaneorum Ephemerides*, 1693, p. 459, No. 18), mentioned in 1693—a sort of Ceylon manna, which perhaps owes its origin to this insect. At any rate it would be highly interesting, if those who can give us information upon this subject would do so.

ON STORAX BARK.

BY DANIEL HANBURY.

Among the drugs formerly imported from the Levant, is one now of rare occurrence, known in works on Materia Medica as *Cortex Thymiamatis*, *Cortex Thuris*, *Thus Judæorum* or *Nascaphtum*, and also by the names *Styrax rubra* or *Storax Bark*. Nothing satisfactory as to its origin has yet been ascertained: by some authors it is supposed to be the produce of *Styrax officinale*, Linn., after the expression of the resin, as related by Landerer*, and when ground, to

* Pereira, *Elem. of Mat. Med.*, ed. 3, vol. ii., p. 1515.

constitute the *Styrax calamita* of the shops; by other authors, it has been referred to *Liquidambar orientale*, Mill., or even to the American *L. styraciflua*, Linn.*

Be this as it may, the bark of *Styrax officinale* as grown in France, is entirely dissimilar to the *Cortex Thymiamatis* of the Levant. When at Toulon in the month of May last, I had the pleasure of visiting in company with M. Chambeiron, an intelligent *pharmacien* and botanist of that town, one of the few localities in France where this beautiful plant is indigenous. In the mountainous woods on the east side of Toulon, in the direction of Cuers, the *Styrax* abounds. As it is cut periodically for fuel in common with the other trees growing near it, it can seldom attain any very considerable size; I observed no tree, I should say, exceeding eight or nine feet in height. At the moment of my visit (17th May, 1854) the *Styrax* trees were in full perfection, presenting with their abundance of orange-flower-like blossoms, a truly beautiful appearance. No trace of resinous exudation could I observe upon the trunk of any, nor did the fresh bark possess the least odour of storax. Of the bark however, as the opportunity offered, I collected with the assistance of M. Chambeiron an abundant sample, taking it both from young and old wood. After it had been carefully dried by exposure to the air, it had assumed the form of tightly rolled quills; in this state it is externally smooth and of a dark greyish-brown, on its inner surface greenish; it is brittle, devoid of odour, and has a slightly bitter, non-aromatic, taste. No odour of storax could be perceived upon heating the bark over a lamp.

The bark of *Styrax officinale* grown in France, is therefore a very different thing from the so-called *Storax Bark* of the Levant. Whether the latter be really the produce of *Styrax officinale*, and the difference in the two be occasioned merely by climate, age of the trees, or other causes, further researches will, I trust, soon show. Landerer has asserted† that the Styrax tree, inodorous in Greece, becomes fragrant at Cos and Rhodes, affording in these islands the resin Storax which is thence exported. But at Rhodes, at least, the trade in it must be very small indeed, as Mr. Niven Kerr, for many years H. B. M. Consul in that island, recently assured me he was wholly ignorant of it.

ELECTRICAL BATTERY.

BY W. SYMONS.

Since completing the electrical machine described in the December number of this Journal, I have constructed a battery possessing many advantages over Leyden jars. The use of plates instead of jars is not perhaps a novel idea; I believe Sturgeon has described something of the kind made of glass. I am unable now to refer to his description, but from what I remember of it it is far more complex and bulky than the following.

Fig. 1 is a plate $\frac{1}{8}$-inch thick, and from 8 to 12 inches in diameter, made of two parts bees'-wax, three shellac, and three or four gutta percha. Melt in an oven, and mix the wax and lac first (a fourth part of Canada balsam seems to facilitate this), then add the gutta percha. This mixture must not be exposed to too great a heat, or the lac will separate. When it can be easily stirred about pour it on a smooth metal slab and press it flat with another slab; when cold repeat this, keeping the two pieces of metal separate by strips of wood a little thicker than the intended thickness of the plates. When cold the plates can be easily removed. They should then be gently and

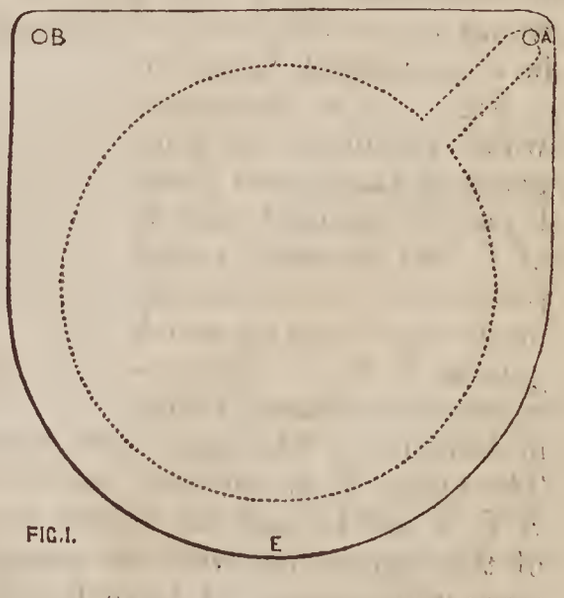

FIG. I.

* P. L. Geiger, *Pharmacop. Univers.* Heidelberg, 1835. 8vo., p. 52. † Pereira, *op. cit.*

uniformly heated one side at a time, the heated side be laid on the metal, and the other side rolled with a smooth wooden roller, strips of wood being placed at the side to regulate the thickness. Gutta percha by itself would do, but the greater part of it as sold is an imperfect non-conductor, and when re-melted, the addition of the other materials is not only a matter of economy but makes it easier to work. Shellac by itself could be used, but it is difficult to free it from bubbles, and it is hard and brittle. Common resin is not a perfect non-conductor.

The plates are then to be cut to the shape of fig. 1, and tinfoil, the shape of the dotted lines, about two inches less in diameter, stuck with lac varnish on one side only, except the bottom plate, which should have it on both sides; the strip at *A* must be alternately at *B*. The holes at *A* and *B* must fit accurately over each other to receive wires; these will rest on the shelf *C*, fig. 2. The wire for communicating with the conductor is represented in fig. 3, and from *H* to *I* should slide through the middle knob, and be long enough to reach to the other, which may be simply a straight wire with a brass knob at the end.

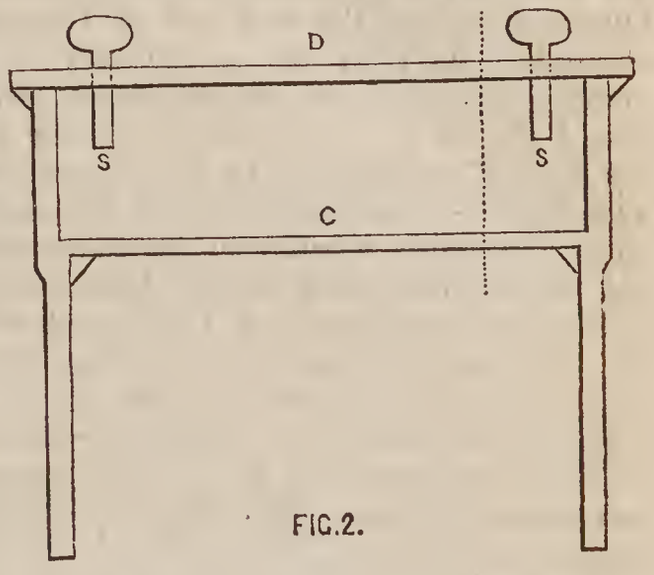

FIG.2.

FIG.3.

Fig. 2 is the principal part of the support. The upright parts are round pieces of the same composition $\frac{1}{2}$-inch in diameter; the piece *C* is flat, and as long from *S* to *S* as fig. 1 is from *A* to *B*; the piece *D* is $\frac{1}{4}$-inch thick, having two wooden screws, *S S*, fixed in it to keep the plates tight together. Another leg, similar to the smaller portion of fig. 2 cut off by the dotted line must be made to go at *E*, fig. 1, and small gutta percha cups made for the screws to work in to prevent injury to the plates. Place the plates between *D* and *C*, observing particularly what is said above about the tinfoil at *A*. Put on the support at *E*, tighten the screws, insert the wires in the holes at *A* and *B*, and the battery is complete. Half a dozen plates will occupy very little room, and give very smart shocks. It can also be carried some distance in the hand, charged, especially if the wire be withdrawn with isolating handles and the sides of the plates be joined together all round; the only disadvantage of which would be, should one of the plates get pierced by being overcharged, it would be more difficult to get at.

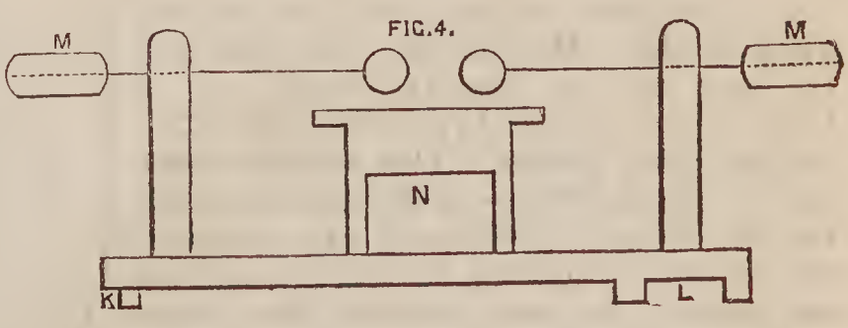

FIG.4.

Fig 4 is a discharger which combines the purposes of Lane's and Henley's. It fits on *D*, fig. 2, at *L*, and the small round piece at *K* fits into a hole on the top of the leg which goes at *E*, fig. 1. The uprights are circular, $\frac{1}{2}$-inch in diameter. The wires work rather tight in these, and the handles, *M*, are loose. The table, *N*, is movable, and is so made that when placed across the piece *K L*, it will be half the height, so as to adapt it for various objects. The whole of this apparatus, with the exception of the wires and knobs, are made of the same composition. I have found a small wooden screw fixed on the wire *M*,

fig. 4, and working in the upright support, of very great service as an easy and certain means of regulating the strength of the shocks.

The battery of course can be used with any kind of machine, and I cannot perceive a single advantage the far more cumbrous and breakable Leyden jar has over it. Another peculiar use of it is, that by uniting the two wires at *A B*, it can be made a part of the prime conductor, when the flat surface will be found very useful for many experiments. If any of the plates should be punctured by an overcharge they can be easily mended with a hot wire and a small piece of the composition.

I find tanned moleskins make the best rubbers and yield an abundant supply of electricity. No amalgamation is necessary, in fact it would be highly injurious to the machine. Mr. M. Roberts, in the *Electrical Magazine*, some years since, proposed a positive and a negative rubber to a glass machine, but objected to cats' fur as soon deteriorating. I have not had an opportunity of trying moleskins, but I would suggest its being substituted for cats' fur. In the same paper he says—"Of course if a resinous plate were used there would be no difficulty in obtaining both positive and negative rubbers." I have consulted most electrical works and tried some experiments, but have not succeeded in obtaining both kinds of rubbers for a resinous plate. Should any of your readers be able to supply the information I should be greatly obliged, otherwise I must continue to suppose Mr. Roberts was mistaken in his "of course." From the tables usually given in books, it may be supposed that a machine made of well baked wood with silk and woollen rubbers would fulfil the conditions; but in some experiments I have made with various kinds of wood and a variety of rubbers, the electricity developed was very feeble, although the wood was well isolated.

With the machine and apparatus now described, without the slightest preparation or precaution, except against dust, I have never failed obtaining a ready supply of electricity even in the most rainy weather; although the machine I have made has only 8-inch plates, and being the first, and frequently altered in its arrangements, is not so efficient as one made from the perfected plan would be.

Amateurs and students in experimental science in general will find by experience that gutta percha and its compounds with resin or bees'-wax will be of almost universal service to them. With a little practice it can be far more readily manipulated than glass, metal, or even wood; and it has this advantage, not a particle need be wasted, but the smallest piece or a discarded apparatus can be melted down and be readily put into a totally different shape. As a proof of the facility of working it, the above discharger, fig. 4, was designed, completed, and used in an afternoon amidst many interruptions and without the slightest assistance.

Dunster, May 20, 1854.

THE MODE OF DISTINGUISHING QUININE FROM QUINIDINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Your last number contains a report of a lecture delivered at Liverpool (before the Liverpool Chemists' Association) by Dr. Nevins, in which the lecturer throws doubts upon the results obtained by previous observers with quinine and quinidine. The subject is not necessarily involved in obscurity, and in order to show the real origin of his difficulties I beg to submit a few observations.

It is difficult to adapt these experiments to a lecture-room; for instance, to ascertain the extent to which sulphate of quinine is soluble in cold water requires some time. If the water is cold, the process of solution goes on extremely slowly when the solution is nearly saturated. Mr. Barry's plan is a better one: he heats the liquid till solution is effected, and then by cooling obtains a cold

saturated solution, with a few minute feathers of crystallization. I think we must, therefore, leave the solubility of sulphate of quinine in water as it has been previously settled. A more important question is the tests for quinine and quinidine, founded upon their relative solubility in ether, or in water as sulphates.

Dr. Nevins appears to have taken as the material for his experiments a substance which was not pure quinidine. He found it soluble in ten parts of ether. No wonder, therefore, that the tests recommended by others failed or only partially succeeded. In order to obtain satisfactory results, we must have a pure article as the basis of experiments; for this purpose quinidine should be crystallized twice out of ether; and any one who will take the trouble to do this will find the old observations tolerably accurate.

It is much easier to obtain sulphate of quinine free from quinidine, than sulphate of quinidine free from quinine. Two or three crystallizations will leave the quinidine in the mother-liquors as the more soluble salt; but if we now attempt to crystallize out the sulphate of quinidine, it will even after repeated crystallizations contain sulphate of quinine, a difficulty familiar enough to chemists in purifying a more soluble salt from a less soluble.

Consequently commercial sulphate of quinidine always contains some quinine more or less, or may happen to contain a good deal, though of course the manufacturer will not purposely sell the more valuable article under the name of the cheaper. Even a small quantity of quinine will considerably alter the reactions of quinidine, especially as to solubility, and will of course give proportionate results under the microscope. But Dr. Nevins' results indicate so large a proportion of quinine, that I suspect some mistake somewhere. I am the more inclined to this opinion, because in procuring a sample of the make referred to (Messrs. Herrings, of Aldersgate Street), I found that ℥ij of ether dissolved the precipitate from 1gr., but did not quite dissolve it when 2grs. were used; the solubility of this is therefore between 60 and 120 parts. This differs so widely from ℥ij dissolving 15grs., that I suspect that some sort of inferior sulphate of quinine must have been accidentally substituted.

Yours very respectfully,

ROBERT HOWARD.

Stratford, June 22nd, 1854.

MANUFACTURE AND CONSUMPTION OF QUININE IN THE UNITED STATES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Although Mr. Robert Howard has written a reply to the article under the above title, which appeared in your May number, yet I think there are still several points requiring notice, the original communication being full of errors.

Quinine was not originally classed in the list of free articles in the new American tariff, and subsequently excluded. The proposed tariff enumerates certain articles to be admitted free, and all others to pay an *ad valorem* duty of 25 or 100 per cent, thus abolishing the present great variety of duties. Quinine would thus come under the lowest duty of 25 per cent.—it now pays 20 per cent.; but it must not be forgotten that bark pays a duty of 15 per cent. There is no probability of the new tariff passing this year.

There are certainly only two manufacturers of quinine in the United States, but we have only two in England, and the same in France and Germany—each country giving a preference to its own manufactured article. Whether they are growing rich in the business depends very much on the skill and capital employed.

Jobst of Germany has not rejected the New Granada barks, nor can quinine, containing a certain percentage of quinine, be admitted into the United States.

Foreign quinine rejected at New York has been on sale in the London market this spring. Quinine if intended to pass as quinine, must be pure.

There ought to be no question about the use of New Granada barks for the manufacture of quinine. Has there ever been an objection to the use of Carabaya bark? As Mr. Howard says, "The quinine contained in them is identical in all, from whatever species obtained." The monopoly of Bolivian bark has proved an universal blessing, by stimulating the importation of other kinds. What would have been the price of quinine if manufacturers had depended solely on the use of Bolivian bark?

We imported last year 17,000 serons of New Granada, and 1500 serons of Bolivian. The New Granada all sold; but the Bolivian, being held for a monopoly price, is still in the market, proving that this kind has very little demand.

Delondre, in his new work on quinine barks, gives an analysis of a New Granada bark containing quite as much quinine as Bolivian Calisaya. If the Calisaya of Santa Fé or Fusagasuga and Pitaya barks of New Granada had been introduced into the market before the Bolivian, there would be no question about the quality of the alkaloids they yield. I am, yours obediently,

16, *George Street, Mansion House.* W. H. Cole.

THE METAL ALUMINIUM, ITS PROBABLE USE IN PHARMACY.

BY W. HAMILTON, M.B.

Some years have elapsed since an addition was made to the multitude of our metallic substances by the discovery made by M. Wöhler in 1828 and 1846, of the metallic basis of clay, which, unlike that of the alkalies, appears to be permanent in all the ordinary states of the atmosphere, and to possess other properties which elevate its intrinsic value, for domestic and other purposes, nearly, if not altogether, to the same level as that of gold, silver, or platina.

To this new metal the name of *Aluminium* has been given, from the earth, or perhaps, more correctly speaking, the oxide from which it is obtained by a process which does not appear to be either difficult or expensive.

Led by analogy, Mr. Brande, in his lectures at the Royal Institution, expressed an opinion thirty-five years ago, that the earth alumina would prove like that of lime, &c., a metallic oxide: but it does not appear that any steps were taken, or at least none that I have heard of, to verify the justice of this conjecture, or divest the metal of those adventitious substances which disguised its nature and obscured its splendour. Like Newton's wonderful hypothesis respecting the combustibility of the diamond, and the inflammable nature of water, the metallic nature of the earth of alum was suffered to sleep in unbroken repose from the year 1819, in which Mr. Brande first launched his hypothesis, to the years 1828 and 1846, in which the researches of Wöhler converted the theory into fact. But it is to the successful experiments made in France by M. Deville, that the world is indebted for the practical results of the hypothesis of Professor Brande and the researches of M. Wöhler; for it was the former gentleman [M. Deville] who first produced it in any quantity, and explained the method by which it might be obtained.

Following M. Deville, M. Chapelle repeated his experiments with equal good fortune. Introducing pulverized clay, mixed with common salt and powdered charcoal, into a common crucible, he exposed the mixture to the heat of a reverberatory furnace produced by coke, but not raised to a white temperature. On being suffered to cool, the crucible was broken, when a multitude of minute metallic globules of the colour of silver, but not exceeding half a millimetre, or about the fiftieth of an inch, in diameter, were found dispersed through the mass within. M. Chapelle, without determining the purity of these globules, ascertained that, while they resisted the action of cold nitric acid, they were soluble in muriatic acid. The globules, thus obtained, admit of being formed

into a mass by melting together, their point of fusion corresponding nearly with that of silver. The mass thus formed is said to equal, if not exceed, silver in the brilliant whiteness of its colour; it approaches iron in its tenacity; its density, or specific gravity, does not exceed 2.56, or that nearly of glass or flint; it may be melted and cooled in contact with the air, without undergoing any perceptible amount of oxidation; it acts well as a conductor of heat, and no doubt of electricity too, which, with its power of resisting the action of the air, whether dry or humid, seems to adapt it peculiarly for the purposes of the electric telegraph; it equally resists the action of sulphuretted hydrogen, rendering it preferable to silver in situations exposed to the action of that gas: it is not acted upon by water either hot or cold, nitric acid whether concentrated or dilute, or weak sulphuric acid; muriatic acid alone appearing to be its proper solvent, at a temperature of 60°.

Such are the more prominent characteristics of this new metal as far as I have been able to collect them from the *Mining Journal*, in which the only notices I have been fortunate enough to stumble upon, may be found at pages 112 and 187 of the current (xxiv.) volume. From the peculiar properties of this new metal, properties in some degree approaching to those of the costly and intractable platina, and especially from its facility of resisting oxidation at the ordinary temperatures to which it is liable to be exposed, from its insolubility in most of the vegetable and mineral acids, with the exception of the muriatic, and then not under a temperature of 60°, from its ductility and malleability, this metal, if obtainable at a moderate cost, either in a state of purity, or alloyed with other metals, appears peculiarly adapted for chemical and pharmaceutical purposes, and merits more consideration than has been hitherto paid to it. Mr. Willich, in a letter of the 13th of last March, published in the *Mining Journal* for the 25th of that month, from which the foregoing facts have principally been borrowed, acquaints us that M. Deville is engaged in further experiments to ascertain the possibility of obtaining aluminium in sufficient quantity for use in the arts and manufactures, and as the substance from which it is procured is so widely diffused throughout the world, and of such easy attainment, there can be no doubt that the discovery of a cheap and simple method of reducing the metal from its oxide would, as Mr. Willich justly observes, "open the way to fame and fortune for the discoverer." Mr. Willich further observes, that he feels "sanguine that M. Chapelle's experiment" [detailed above] "may be repeated with better success *on a large scale*, and by additional portions of salt and charcoal being intimately mixed with the powdered clay. Both soda and chlorine," he continues, "have considerable action on alumina and its metallic base. Why should not carbonic acid be formed by the burning carbon absorbing oxygen from the alumina in its transition state, thereby leaving the metal at liberty? I hope those who have the means at their disposal will not fail to try the reduction of the metal from clay in large furnaces. *I cannot doubt of ultimate success.* That success will open a vast field to the industrial energies of the country, and far exceed in real utility the golden treasures of California and Australia. The useful application of such a metal I need not point out to your readers. In fact, the metal is superior to silver, on account of the unchangeable character of its influence. Why may we not have aluminized iron for our roofs and general new work, instead of the galvanized iron?"

Such are the concluding remarks of Mr. Willich's valuable communication; and as the subject, although one of considerable importance to the Pharmaceutical Chemist, has hitherto been unnoticed in the pages of the Pharmaceutical Journal, I thought it would be doing an acceptable service to science to call the attention of practical men to it. Although making no pretensions to originality, this notice may not be without its use in promoting more extensive experiments, and bringing us more fully acquainted with the properties and uses of this new and promising substance, the introduction of which, from its singularly low specific

gravity, cannot lead to any deterioration of the metals hitherto applied to the fabrication of plate, or the purposes of a circulating medium.

14, *Octagon*, *Plymouth*, 22*nd May*, 1854.

ON THE MANUFACTURE OF ALUM AND SULPHATE OF ALUMINA.

(*Concluded from page* 678, *vol. xiii.*)

The most recent improvement in the manufacture of alum is that for which Mr. J. F. Wilson took out a patent, October 5th, 1853. This invention consists in the use of muriate of potash, or muriate of ammonia in conjunction with ammoniacal liquor in the manufacture of alum from shale, by means of sulphuric acid. Muriate of potash has been long used in the manufacture of alum when made from the common alum schist, as at Whitby and Hurlet, and has been found advantageous, both in consequence of being the cheapest form of potash salt, and also from decomposing the sulphates of iron present in the liquors, and rendering their sulphuric acid available in the formation of the alum. In manufacturing alum from clay, however, this salt of potash has been found unsuitable, as the iron present is inconsiderable in quantity, and f used it would cause a decomposition of the sulphate of alumina itself. It has been found necessary, therefore, to decompose it, and convert it into sulphate of potash before using.

In the manufacture of alum from common shale by sulphuric acid, a good deal of iron exists in solution in the liquors, rendering it a desirable matter to use muriates, for the same reason as in the alum made from schist; but the existence also of a large amount of free sulphuric acid, has hitherto prevented their being employed, as this free acid disengages the muriatic acid or chlorine in the liquor, and rapidly destroys the leaden vessels used in the manufacture.

Mr. Wilson has found, however, that when this manufacture is carried on according to his process, as described in the specification of his patent for England, for "Improvements in the manufacture of Alum, of date December 7th, 1850," in which he uses distilled ammoniacal liquor to neutralize the free acid in the liquors, and combine with the sulphate of alumina to form alum, that he can use a certain portion of muriate of potash or of ammonia with very considerable advantage, both in saving the acid in union with the iron, and also in preventing a deposit of basic sulphate of alumina. In order to carry out the invention, all that is necessary to modify the process, as described in that specification, is as follows, viz.: Instead of adding as much ammoniacal liquor as is there described, that is to say, as much as is required to convert the whole sulphate of alumina into alum, Mr. Wilson adds only about three-fourths of that quantity; and for the remaining one-fourth of alkali necessary he adds muriate of potash, or, if the price admit, muriate of ammonia, either in the solid state or in solution, as may be convenient. The exact quantities of muriates and ammoniacal liquor respectively, however, which should be used in each case, will depend on the shale employed, and the consequent quantity of iron present. What is necessary to be attended to in carrying out the process is, firstly, that the quantity of acid used should bear such a proportion to the alumina which the shale yields, that the excess of free acid shall not be more than can be neutralized by the ammoniacal liquor added; and, secondly, that the muriates used should be as nearly as possible what is required to decompose the sulphates of iron present. What these may be in each case will be found by testing the liquors, as is well understood.

Manufacture of Alum from the Slag of Blast Furnaces.—In his patent of March 8, 1852, Mr. Cunninghame proposes to treat the slag of blast furnaces with sulphuric acid, so as to act on the lime, silica, and magnesia present, and to convert the alumina into sulphate of alumina fit for the manufacture of alum. To facilitate the action of the acids on the slag, the latter should be run direct from the blast furnace with water, and then finely ground.

Apparatus for Concentrating and Crystallizing Aluminous Solutions.—Mr. Gamble patented Feb. 12th, 1826, an apparatus for concentrating aluminous solutions, which consists essentially of one boiler or metallic vessel of a suitable shape, placed within another, the space between the two vessels being filled with oil, and constituting what is now well known as the oil-bath. The vessel he employs for the crystallization of alum, is a vessel of lead or other suitable metal, wider at the mouth than the bottom. This vessel may be fixed on or below the ground, on a solid foundation, from which

foundation it must be separated about four inches by three or more pillars. A brick wall surrounds the vessel, leaving a space all round its side to admit the circulation of steam, which comes from a steam-pipe passing from a boiler through the brick wall to the centre of the bottom of the vessel. In the centre of the vessel, resting on the bottom of the vessel, and rising above it, is a staff, having a ring on its upper end and a large knot at its base. This staff is placed on the bottom of the vessel before the crystallizing liquid is poured in. When the crystalline mass is ready for withdrawing, a chain from a crane is attached to the ring of the staff, steam is admitted round the vessel for five or ten minutes, more or less, according to its quantity ; and when the upper part of the crystal in contact with the metallic vessel is observed in a slight degree to liquefy, the crane is turned, and the entire mass of crystals is elevated, and removed to a proper place for breaking up the crystals and receiving the mother-waters. Where many crystallizing vessels are required, the crane may be placed in the centre, and one or two circles of crystallizing vessels formed around. A breach should be left in the circle when the alum may be broken up, and a channel formed to convey the liquor to the reservoir. The case surrounding the vessel may be made of wood or other suitable material instead of the brick wall, and be made fixed or movable at pleasure.

At page 775, vol. ii., of the *Pharmaceutical Journal* there will be found the copy of an article which appeared in the *Mechanics' Magazine*, showing the absurdity of the process patented by Mr. Kagenbusch for the manufacture of alum, and reported in the early part of this notice. We now find that the opinion therein expressed was justified by subsequent experience, the process having been tried at the Mulgrave Alum Works, and found to be a perfect failure. It has been stated that as much as £10,000 were lost by this man's absurd schemes, one of which was the conversion of the alum mother-liquors into a colour which was to beat indigo out of the market. So much for Mr. Kagenbusch's patent process for manufacturing alum.

In giving a resumé of the various processes, either employed, proposed, or patented in the manufacture of an article, our especial object is to show what has already been done in the manufacture, in order to serve as a guide to others who (as has oftentimes been the case), supposing they have hit upon some grand discovery, do not find out until too late, that they have been forestalled by some more fortunate individual, who is already in possession of a profitable return from his earlier patented invention of precisely similar character. We could cite many instances to prove the utility of such a resumé; but the long list weekly published of "Provisional Specifications not proceeded with," proves quite sufficient for our purpose, and indicates the ignorance which exists as to what had been done previously in the same branch of manufacture.

To furnish a correct opinion of the value or worthlessness of any particular process mentioned is far beyond our power, nor do we consider it necessary. If inquiries be made of the patentees, it will usually be found that they are ready to give the most flattering account of their processes, especially if they be desirous of granting licenses for the use of them. Of this we could furnish an illustration from a Dictionary of Chemistry now appearing in monthly parts. On the other hand, critics have so often erred in their judgment, that it is by no means safe to trust to their *dicta*, especially on scientific matters. When Chevreul and Gay Lussac took out a patent in England (with the name Moses Poole, patent agent) for the manufacture of stearine candles, in the specification of which patent they speak of tallow as containing two acids, a critic of the day, in a note appended to the report of the specification, observed as follows:—"We have seldom seen in so small a compass more gross errors, or such entire ignorance of the first principles of Chemistry, as are exhibited in the specification of this patent. As a curious development of the aberrations of the human intellect, we should be glad to know what could lead the patentee to assert that tallow consisted of two acids, or that the matters of which it was composed, or into which it can be converted by saponification, were *acids*." Again, "We are surprised how any person of the least judgment could be led to suppose that any benefit could result from it for the purposes mentioned ; it would indeed, on the contrary, be wasteful in the extreme." The important results which have followed from the researches of Chevreul on the "fatty acids," are too well known to require comment.

REPORT ON THE GEOLOGY OF THE SIERRA NEVADA, OR CALIFORNIA RANGE.

BY PROF. JOHN B. TRASK, 1853.

This Report has been forwarded to us by Mr. George L. Napier, of Salmon Falls, El Dorado County, California, an Associate of the Pharmaceutical Society. Our space will not permit us to give more than an abstract of the Report.

It should be stated that the Report was made in compliance with a resolution of the Senate of the State of California, passed March 26, 1853, calling upon Dr. Trask for such information in relation to the geology of the state as he might possess.

In reference to the geological formations, Prof. Trask observes—

There can be but little doubt that the southern section of the country was in a state of disturbance long after the more northern section sunk into repose, and that for many ages, volcanic fires exerted a wide and powerful influence throughout that district long after its emergence. As these fires died out a long period of repose followed, during which the land became inhabited by mammalians of various character and species, some of which were of mammoth size, as their relics at the present day attest.

During the age that these huge quadrupeds held their uninterrupted sway throughout the land, which was during the tertiary epoch, another convulsion, which fully equalled the former, occurred, and through its fiery ravages swept from existence the entire race that occupied its surface and inhumed their remains beneath its scalding flood. Ages have since rolled by, and it was left for the toiling and industrious miner in his daily avocations to exhume from the bosom of the earth these scattered vestiges of the wreck of former ages.

We find the most ample evidence of this state of things after passing the Cosumnes river and as far south as the Tuolumne, beyond which as yet no vestiges of these animals has been found.

From all the attendant circumstances it appears that during the period of repose a large portion of the southern district was covered by water (probably fresh), in the form of lakes, and that these animals inhabited their borders. Their remains are found in the diluvial drift at the depth of ten to twenty feet below the surface, and this is covered in most part by a volcanic tufa, the product of recent volcanic action.

The other fossils which have been found in these districts are such only as occur among primary limestone, and consist of algæ (a seaweed of the lowest order), which leads us to the conclusion that the rocks which now form the dry land of the interior were formerly submerged beneath the ocean, and have been elevated to their present position through volcanic agency, exerted through long and successive periods.

The district of country between the Cosumnes river and the fortieth degree of north latitude, has strong evidence of having been the first that emerged from the ocean, but though the primary section, it presents most indubitable traces of subsequent rupture ; it probably occurred during those periods when the south was in a state of extreme activity, and must have played an important part in modifying the contour of the country.

The mineral district is arranged into *three classes*, as follows :—

1st. Primary or central districts, included between latitude 38° 30′ and 40° north. The rocks that compose this district are for the most part primitive in a geological sense, being composed of granite, porphyry, trap and other allied rocks, among which serpentines form no unimportant part.

2nd. The northern district, included between 40° and 42° north. This contains, in addition to those noticed in the primary, some few that should command attention in an economic view, so far as relates to their prospective value, as buhr-stone, a hard silicious rock ; also some few traces of secondary rocks, a suite almost entirely wanting, with this exception, in this country so far as at present explored. The importance attached to this group at the present time in this country is found in the fact, that it is to this suite that we must look for a home supply of the mineral coals, if ever found within the limits of our state.

3rd. The southern district, included between 38° 30′ and 36° north latitude. This district, like the other two, contains many rocks in common, but in addition to these, other formations which differ widely ; one of considerable importance is the large extent of volcanic tufa. This deposit covers the diluvial drift in many places, as well also the large mammalian remains that have been exhumed within the last two years. It is interesting and important, as it points to volcanic action at a comparatively recent date.

In review of the subject before us, we find that there are evidences of at least three successive periods in which this portion of the continent has been involved ; the three periods of upheaval being interrupted by long periods of repose.

In the *second* upheaval the larger portion of the extreme northern district was developed, which was, probably, nearly contemporaneous with the development of the south. A long interval of equiescence is here manifest, during which the land became inhabited by mammals of varied species.

In the *third*, we find that these species were obliterated, and their remains lie buried beneath the evident causes of their destruction.

4th. The granite appears to have been the first of the volcanic group, and that it broke through the slate. The other trapean rocks appearing within the latter part of the first period.

5th. The older granite appears disturbed by more recent rocks, as well also as by more recent granites of the same species. In this particular the granite suite resembles the Heidelberg, presenting three distinct veins of different ages.

6th. The serpentine rocks : many of them appear to have been contemporaneous with the second period of disturbance, as is shown by their cutting through the older rocks.

7th. We are led to infer from the manner in which the trapean and other volcanic rocks have forced their way through the sedimentary formations, that these rocks must prove metalliferous, as analogy and experience has proved in other parts of the world. Time will not permit to discuss the local geology of the state in a separate and distinct subject ; it will, therefore, be considered under the head of mining resources, which we shall now attempt to elucidate.

Quartz Mining.—The quartz formation forms an important point in the various groups that abound in this country ; not so much in proportion of its masses, as they are small when compared with almost any other member of the plutonic series. The comparative range of country which they pass through, cannot be considered as amounting to more than one-twelfth of the width of the mountain range. The area that it occupies is also very small, compared to the rocks they pass through, being composed of small veins and dikes, cutting other formations, both igneous and sedimentary.

The rocks throughout the country present many and distinct phases. On close examination they are found to be a disturbing and intrusive rock, while in other cases a feature the reverse is presented, they being disturbed by other rocks ; and still another feature is often present, and frequently in the same locality ; thus it is that some veins appear to have been unaffected, while adjacent veins are much disturbed and broken down.

With these premises before us, it would seem impossible to refer the entire group to one period, for the facts presented would remain unexplained, while many of the attendant discrepancies that have attached themselves to those operations which have resulted in loss and disappointment to the adventurers in this branch of mining, will in a great measure be found referable to these probable differences in the ages of these rocks.

It is found that there are eight distinct series of veins in some of the mining districts of England, and that these veins vary in value according to their relative age and position. It is made a practical point of examination before entering on mining speculations in this country, to ascertain the relative age of a metallic vein before entering in the enterprise of extensive operations. We would therefore suggest the following proposition in relation to the auriferous veins of this country.

That the value of these veins will be found in the relative age which they maintain to the rocks with which they are found in connexion, being modified, as their passage is found to be through igneous or sedimentary rocks.

This suggestion is made in the hope that less disappointment may be experienced by those who seek a profitable and laudable employment in those branches of

industry, and also to check in some measure those hasty and inconsiderate generalizations that once promised to blast the most brilliant prospects of the state. Two years since, this opinion was maintained and also made public, and the estimate then made of the probable fate of a large portion of those who had embarked in these speculations was predicated, in part, on these grounds. How far that prognosis has proved true the public can best judge. Another and an important point in this subject, is the association of the metal with other minerals in the vein. A large portion of the gold in these veins is frequently combined with other minerals, most of which are of a compound character—as the oxides of iron, and also its sulphurets (pyrites).

It must be seen then, that one general and indiscriminate treatment of ores must not only prove annoying in the results that are obtained, but highly disastrous in the extraction of the metal; for the process that would relieve the metal in one case, would only serve to fix its investing matrix more closely in the other. Hence has arisen much of the discredit to this branch of mining and pecuniary losses. This has been sustained from the neglect in making the necessary selection of ores from the same vein, and applying the same treatment for each variety. The experience in this branch of mining of the past eighteen months, has demonstrated too truly and sadly that those methods heretofore adopted cannot be pursued with profit, but on the contrary, that certain loss must be the result of this system, too hastily entered upon, and too thoughtlessly pursued, in whatever branches of industry it may be applied.

Platinum.—This metal appears as widely distributed as gold. There is scarcely a section of country in which gold has been found, but that this metal also has been discovered. This fact would lead us to suppose, that from the commercial value of the metal in its crude state, being about one half that of gold, that it may at some future day be sought for as an article of commercial export among the exhausted placers of the country. It is to be regretted that a more intimate acquaintance with this metal among those engaged in the mining districts, does not exist, as I feel fully confident that the value of our mines would be enhanced nearly twenty-five per cent. by its collection.

The wide dispersion of this metal through this country would indicate that at some future day it may be made a source of profit.

Silver.—This metal has been found in several of the mines that have been opened in this state, all of them thus far situated in the southern district. It was first met with in a district vein, running parallel with a vein of gold in the South Carolina mine at Carson Hill. At this place I obtained a fine specimen. I was informed of its being found in the Old Dominion mine, beside the above, and north of it; and also in the Relief mine, south of it. The New York Mining Company, on the opposite side of the river, at Eagle Hill, was the next in which it made its appearance. At the Chilian mine, two miles north of Columbia, it occurs, associated with copper and gold in quartz in the form of sulphuret; also Frazer's mine, twelve miles east of Sonora, with galena and zinc-blende in the same rock. At these localities it is generally disseminated through the quartz.

At the Washington and Georgia mine, Quartzburg, in Mariposa county, I observed this metal in the form of ruby-blende in the vein-stone containing the gold, and when the metallic gold appeared, it was a little lighter in colour than common, evidently from a slight alloy of the two metals.

This metal in other countries has proved a great and important source of wealth. From its casual occurrence in our mines, and its evident tendency of increase, as you advance south from Stanislaus, there is just reason to hope that it may, in this country, become the source of wealth and profit.

Copper.—This metal is much more widely distributed than the silver, through the western flank of the range. Commencing on the extreme north, it is found on the North Fork of the Trinity, a short distance from its confluence with the main stream, in a metallic state, in crystals and masses. The vein cuts both sides of the river, but its entire extent is not known. Vitreous copper is found adjoining, and also malachite. It occurs on both the Middle and South Forks of Feather river, in the form of carbonate; also between Nevada and Grass Valley, near the Half-way House, and in many parts of the southern mines. I cannot speak with certainty in respect to the ores of this metal in the coast range, having never seen them; but judging from the character of the ores which have been brought from there, we feel

warranted in believing that it exists in large quantities, but subsequent exploration must alone determine this point. The varieties of ore which we have seen from these sections, are of that character that would make their reduction easy, if they exist in sufficient quantities to warrant investment.

Chromium.—I would invite your attention particularly to the ores of this metal, inasmuch as from its appearance in large quantities in some sections of the state, and the extensive distribution of the serpentine rocks to which it is also incident, we may expect, with a great degree of confidence, that it will be largely developed within our borders. It is an article of great commercial importance throughout the civilized world. Its principal use in the arts is for the colouring of porcelain, dyeing, and as a pigment. The fine chrome yellow so highly prized is manufactured from this mineral. Nearly all the chrome used in the world is produced from the mines of the United States ; the Shetland Isles producing the next largest amount. The principal locality, and we might say nearly the only one on the Atlantic border from which this mineral is derived, is at the *Bare Hills*, near Baltimore, and this affords the supply of the world.

The greatest amount that can be obtained from all sources at present known is about two thousand tons, though the market would consume a much larger amount could it be obtained. From the limited supply in the market the public will, at no distant day, be directed to its development in this state. So soon as cheap and rapid means of communication are obtained with the interior of the state, this ore will probably become an article of export, to a large extent, to China, and the Atlantic States, and England. It would be unnecessary to make it an article of export even, unless its reduction would prove too expensive in this state, on account of the high price of labour, for ample material usually exists in its vicinity for this purpose.

The high prices of the various manufactures from this mineral cannot fail to attract attention to its further development ; and I feel that the value of the mineral will be sustained when we say that its market price in the state of rough ore will equal the product of our best ores of gold in their average, being about eighty dollars per ton. It has maintained this price very uniformly for a number of years.

This mineral is found in veins and masses running through serpentine rocks. These masses are often large, weighing from sixty to eighty pounds, and smaller, and generally disseminated through the rock and upon its surface.

The finest specimens the author has ever seen have been found in this country, and in some localities in large quantities. A striking feature in the country that abounds in this mineral, among the serpentine formations, is the peculiar bareness of the immediate district compared to other surrounding sections, and an individual once observing it, would scarcely fail to recognize its characteristics even at a considerable distance.

The principal localities that have been observed as abounding in this mineral are upon Nelson Creek, near its junction with Feather river, in fragmentary masses ; on the ridge, between the North and Middle Forks of the American, in small fragments ; on Bear River, four miles above Anson's Ferry ; in the Cayote Diggins, near Nevada ; and on Deer Creek, two miles below the city of Nevada.

It is at this last-named locality that its attendant peculiarities may be most conveniently studied. It occurs here in large amorphous masses of twenty to fifty pounds weight, scattered over a low range of hills of some four to six miles in extent. The mineral would be easily mistaken by the passing traveller for large fragments of some of the darker trap rocks, or dark porphyries.

It is very dense, and possesses a semi-metallic lustre. Rolled fragments are often found of considerable weight on the banks of the creek in the vicinity. My attention was first directed to this mineral by Mr. Henry Pratten, who is at the present time connected with the Geological State Survey of Illinois, and formerly of the Minnesota Survey, by the United States.

In what follows, relating to other minerals observed in my tour through the country, I shall confine myself to the principal ores only and their localities, unassociated with their different varieties, as the limits of this report will not permit of more elaborate detail.

Commencing with the auriferous group. Among the auriferous rocks we find—

Talc—at Central Company Mine, Marthenas Creek.

Chlorite—Volcano Mine, Middle Fork, American.

Talc—Dry Creek, El Dorado County.

Chlorite—Angels.
Peroxide Iron—Cayote Mountains, Sonora.
Heavy Spar—Armagosa Mines, Desert.
Arsenical Pyrites—Head of Bear River.

SILVER.

Argentiferous Galena ... .Frazer's
Zinc-Blend and Arsenic ..... Do.
Sulphuret Silver and Malachite .....Columbia

MISCELLANEOUS.

Marble, white .....Ringgold
Do. clouded ..... Do.
Do. variegated... Do.
Do. jet ..... Do.
Do. white .....Volcano
Oxide of Iron & Gold .Frazer's
Arsenical Pyrites ... Do.
Foliated Graphite ...Amidor
Marble .....Deer Creek
Arsenical Pyrites in Argelite } Eagle Hill
Vitreous Copper.....Carson's Hill
Silicate Do. ..... Do.
Carbonate Do. .....Columbia
Franklinite .....Stanislaus River
Jasper .....Volcano
Do. .....Talbot's Hill
Carbonate Copper ...Round Tent
Do. ...Grass Valley
Sienitic Granite ... Do.
Augite Do. ...Anson's Bear River
Do. Do. ...Auburn Creek
Scoria .....Sugar Loaf, Nevada
Sienite .....Half-way House
Peroxide Iron .....Deer Creek
Peroxide Manganese Deer Creek
Cinnabar .....Deer Creek
Do. .....Yuba River
Petrifactions .....Talbot's Hill
Do. .....Nevada
Do. .....American River
Do. .....West Hill, Nevada
Lignite.....Nevada
Molybdenum ..... Do.
Fossil Leaves ..... Do.
Fossil Lichens.....Wade's Creek
Pitch Stone.....Sugar Loaf, Nevada
Do. ..... Double Springs
Mammalian Fossils teeth } Sonora
Do. Do ...Douglass' Flat
Do. Do. ...Murphy's
Do. Do. ...Vine Springs
Fossil Shells, Miocene Butte Creek
Do. Do. ...Chico
Magnetic Iron..... } El Dorado and Placer Counties
Obsidian ....Butte County
Peperino ..... Do.
Emerald .....Vallicita
Rock Salt .....Near Sonora

Ossiferous Cavern on Wade's Creek, containing human bones, teeth of the wild boar, and other animals. There are other caverns of considerable extent in the calcareous formations of the state, but nothing peculiar was observed in them. Those visited were Martin's Cave, Middle Fork American River, M'Kinney's, and Volcano, in Calaveras county.

Mineral Springs.—There are several mineral springs scattered through the country, consisting mostly of chalybeate and sulphur ; they are widely dispersed, but a few of them will be noticed.

Chalybeate Spring, upon .....Destruction River
" " " .....North Feather do
" " " ..... " Yuba English Bar
Sulphur Spring, at .....Jackson, Calaveras County

This last is the most important of all, and to be found in any quantity ; it will probably become a place of resort for invalids in the future, as its waters are powerfully medicinal.

ON THE FREQUENT PRESENCE OF IODINE IN MINERALS, PLANTS, AND ANIMALS, AND THE VARIOUS TESTS FOR ITS DETECTION.

BY E. RIEGEL.

Recent investigations have shown that iodine occurs in small quantities much more frequently than was hitherto supposed, and a statement of the various cases in which its presence has been observed, may have some degree of interest for many. The marine plants in which iodine was first discovered, appear to contain the largest quantity :

	Percentage of Iodine in the dry plant.
Fucus filium	0.0894
" *digitatus*	0.135
" *saccharinus*	0.230
" *vesiculosus*	0.001
" *saccatus*	0.124
" *siliquosus*	0.142

Fucus nodosus and *lorcus* contain a little iodine, so likewise *fucus cartilagineus, membranaceus, rubeus* and *palmatus*, according to H. Davy, Gaultier, and Fyfe; *sphærococcus crispus*, according to Sarphati ; *sphærococcus helminthocorton*, according to Straub, Happ, and Gaultier; *in ulva linza, pavonia*, according to Sarphati, H. Davy, and Balard. Meyer found the percentage of iodine in

Ulva umbilicalis	0.0590
" *lactuca*	0.0550
Zostera marina	0.0005

It had long been known that the ash of fuci and other marine plants, as well as the varec of Brittany and the kelp of Scotland, according to Courtois and Fyfe, contain a quantity of iodine by no means inconsiderable, while the ash of *salsola* and other land plants, as well as the Spanish barilla and the Roman and Sicilian soda, contain, according to Fyfe and H. Davy, little or no iodine. Duvault is of opinion that the iodine of marine plants exists in the form of iodide of potassium. The presence, according to Dickie, of iodine in *lichen confinis, statice armeria*, and *grimmia maritima*, growing upon rocks to which the wind sometimes carry sea water, and its absence in *remelina scopulorum*, growing in the same place, is curious.

Iodine has likewise been found in *jungermania albitans*, by W. v. der Marck ; in *j. pinguis*, in *confervæ* and *oscillariæ*, especially *o. grateloupi*, by Meyrac ; in *armeria maritima*, when growing near the sea, by Völcker; in *nasturtium officinale*, by Müller. Fyfe, Sarphati, and Dickie, did not find iodine in *salsola kali, plantago maritima* and *nicotiana tabacum*, which grew near the sea. It was found by Busse in *muscus corallinus*; by Righini in *asplenium trichomones, aspidium capillus veneris ;* by Straub, in the turf of Hofwyl; by Guillermond in sarsaparilla root. Iodine was long since detected by Preuss in the potash of commerce, and more recently Lamy and Fehling found it in the potash obtained from the molasses of the beet-sugar factory at Waghäusel, and their observation has since been confirmed by many. Lamy also found iodine in the beet of Waghäusel, but not in the raw or refined sugar, nor any trace of it in the beet or potash from a factory near Valenciennes.

A. Overbeck found iodine in the ash of several *ranunculaceæ, r. flammula, ficaria ranunculoides.*

It has been found by Gaultier, Fyfe, Straub, Göbel, and Stratingh, in sponge and in the following marine animals—in *spongia oculata*, by Sarphati ; in *gorgonia flabellum, flustra foliacea* ; varieties of *serutularia, tubularia, rhizostoma*, and *cyana* ; in *asterias rubens, crognon vulgare, mytilus edulis, ostrea edulis* ; varieties of *doris*, and *venus*, and *pleuronectes flexuo.* The oil prepared from the liver of many varieties of *gadus* contains iodine, according to numerous researches. Gräger gives as the percentage 0.0846 ; Wackenroder finds that it varies between 0.162 and 0.324.

The oils from the liver of *raja clavata* and *batis* likewise contain iodine, and, according to Girardin and Preisser even more than cod-liver oil. On the other hand, Fyfe, Stratingh, and Sarphati, could not detect iodine in the corals, the eggs of *buccinum undatum*, or fish gelatin. According to Jonas Scotch salt herrings contain only a trace of iodine. Traces were found by Holl in the liquids of *julus fœtidissimus*, and by Landerer in crabs, star fish, echini, &c.

The presence of iodine in minerals and natural waters is frequent. It was found by Del Rio and Vauquelin, combined with mercury and silver, in the cerussite of Catorce (Mexico) ; by Bustermann, Menzel and Cochler, in very small quantity, in Silesian zinc ore ; by Fuchs, in the salt of Hall (Tyrol)—according to O. Henry all salt contains iodine—by Hages, Lembert and Reimbach, in native nitrate of soda.

Duflos found iodine in the Silesian coal ; Bussy and Graf confirmed his observation, and the former found it in the form of iodide of ammonium, together with chloride of ammonium, in the combustion products of the burning coal mine at Commentry, as well as in the distillation products of coal ; Mene likewise found bromine in the condensed liquor of gas factories.

It is remarkable that Reinsch was unable to detect iodine in the saline efflorescence

at the burning coal beds at Duttweiler, although it was found by myself in the coal of that district, and by Genteles in the clay or alum slate of Lathorp (Sweden), a circumstance which tends to confirm Forchammer's opinion that alum slate was formed by the decay of fuci, &c. The efflorescence at Duttweiler is of two kinds; one consisting, according to Reinsch, chiefly of ammonia-alum, with traces of potash-alum, chlorides of sodium and ammonium, together with very minute quantities of bromide of ammonium, but not a trace of iodine. The other kind is chloride of ammonium, sometimes quite white and pure. Reinsch found it to contain from one to two per cent. of bromide of ammonium, but no trace of iodine.

Lembert found iodine in the Jura limestones near Lyons and Montpellier. He was unable to ascertain in what state of combination the iodine exists in the limestone, but from the statement of Chatin, that all rocks in which iodine has been detected contain likewise protocarbonate of iron, he is of opinion that this circumstance may explain the presence of iodine in most ferruginous waters.

Chatin detected iodine in clay, vegetable mould, sulphur, cinnabar, iron and manganese minerals, in minute quantity in gypsum, white chalk and limestone.

It has been found in a great number of brines and other mineral waters, where, according to Morin, it is in the state of iodide of sodium, calcium, or magnesium; in the brines of Sülze (Mecklenburg); of Kolberg (Pomerania); of Salzuflen and Konigsbronn, near Unna, of Rehme, near Minden, of Schonebeck, Halle, Duremberg, and Kosen, Hubertsbrunnen, near Thale (Hartz), Arsern and Salzungen, Schmalkalden, Salzhausen and Creuznach, Bolechow and Drochobyez (Galicia), Kenohwa (North America), and in the province Antioquia (New Granada). In the analysis of the Wurtemberg brines by Fehling, and of the Soolsprudel by Bromeis, no mention is made of iodine, but Denecke found traces of iodide of magnesium in his analysis of the brine at Werl (Westphalia).

Iodine has been found in the waters of a spring near Saragossa; in the thermal water of Albano; in a spring water near Sales (Piedmont); in several saline waters near Ascoll; in the sulphuretted water of Cartel Nuovo d'Asti; in the thermal water of Aix (Savoy); in the water of Bonnington spring, near Leith; in the water of Bad Marienbad, Carlsbad, Heilbrunn, and the spring water of Künzig (Bavaria); in the goitre water of Hall; in the sulphuretted water of Trutkawiec, and the alkaline water of Inowicz (Galicia); in the water of Wildegg; the sulphuretted water of Aix la Chapelle; in the spring water of Cheltenham; of Assinam, in India; of Sail-lis Chateau Morand (Dep. d'Loire); of Sulz (Alsace); of Varennes (Canada); of Evaux, Neris, Vichy, St. Honoré, Barages, and Cauterets; of Gebagan (India); Krankenheil (Bavaria); of the spring near Halle; of springs in Java, Zahorowitz (Moravia), Bristol, Salzschlirf, Tatenhausen (Westphalia), Caledonia spring (Canada).

Sea water contains so little iodine that Tennant, H. Davy, Gaultier, Fyfe and Sarphati, were unable to detect its presence. However, Balard found it in the Mediterranean water, and Pfaff in that of the Baltic, which is very poor in iodine. Tornt and Herapath found only doubtful traces of iodine in the water of the Dead Sea, and Dugeud believes that the water of the Oldenburgh marsh contains iodine. From what has already been stated as to the presence of iodine in marine plants and animals, it will be seen that they appropriate iodine in considerable quantity as iodide of potassium, sodium, calcium or magnesium.

Chatin detected iodine in rain and fresh water, 0.0002 to 0.0005 in ten liters. The rain water from the interior of France contained far more iodine than that which fell near the sea, and after long-continued rain the water was free from iodine.

The usual method formerly adopted for the detection of iodine was to add starch paste to the liquid to be tested and then nitric acid, which, by liberating the iodine, gave rise to the production of the characteristic blue-coloured compound of iodine and starch. Instead of nitric acid, chlorine water may be used to liberate the iodine, but it must be added with great caution, because an excess destroys the blue colour so readily that minute traces of iodine may be overlooked. Nitric acid does not itself produce this effect, but when the iodide is accompanied by a large quantity of chloride it liberates chlorine at the same time, so that in such cases the cautious application of chlorine water is preferable.

A solution of nitrate of palladium is recommended by Lassaigne as a reagent for iodine. The protiodide of palladium is black, insoluble, and is deposited only after some time.

A. Reynoso proposes to separate iodine and bromine from metals which prevent its reaction with starch by means of a substance, which does not, like chlorine, combine with it. He uses peroxide of barium, a piece of which is mixed in a test-tube with water, hydrochloric acid and starch paste, and when the evolution of gas commences, the liquid to be tested for iodine is added. When chlorides, sulphurets, sulphites, or hyposulphites are present, their influence as regards the reduction of peroxide of hydrogen may be counteracted by using a larger quantity of peroxide of barium. It is stated that a millionth part of iodine may be detected by this test.

Casaseca considers that the use of pure nitric acid with starch is quite as safe as peroxide of barium. In order to detect iodine in mineral water he extracts the dry saline residue with acetic ether, in which the alkaline iodides are soluble, while the accompanying bromides, chlorides, sulphites, and hyposulphites are insoluble. The solution is evaporated, the residue dissolved in water, and treated with nitric acid and starch paste.

E. Marchand tests ashes and mineral water for iodine by mixing the aqueous solution in a stoppered vessel with dry starch, excess of hydrochloric acid, and about 0.0001 grm. of chromate of potash. After shaking the mixture and allowing it to rest, a rose colour is produced, when ten cubic centimeters of liquid are used, containing only $\frac{1}{500000}$ of iodine.

Rabourdin takes advantage of the fact, that free iodine dissolves in chloroform with a violet colour. If ten grm. of a liquid containing $\frac{1}{10000}$ of its weight of iodide of potassium are mixed with two drops of nitric acid, fifteen or twenty drops of sulphuric acid, and one grm. of chloroform, the latter acquires a violet colour when the mixture is shaken. This colour is more intense in proportion to the quantity of iodine present, and may serve for the approximative estimation of iodine by comparison with similar solutions of known value. Chloroform abstracts iodine even from an aqueous solution; when it contains ether the colour produced is not violet, but more or less red in proportion to the quantity of ether.

Lassaigne gives the preference to chloride of palladium as a reagent for iodine, which is more delicate than starch, and which has the advantage of indicating the presence of iodine in saline compounds when starch no longer gives a result. He states that he has detected two-millionths of iodide of potassium in 2000 grm. of water by the brown colour which chloride of palladium communicates to the liquid. After the lapse of twenty-four or thirty-six hours flocks of iodide of palladium separate, which, when mixed with a little moist silica and heated in a tube, evolve violet iodine vapour.

Winckler recommends as the most delicate test for iodine, next to chloride of palladium, nitrite of potash or soda; he found this reagent capable of indicating the presence of $\frac{1}{6000}$ grm. of iodide of potassium by means of the blue colour communicated to starch.

According to Grangé a few bubbles of hyponitrous acid, when free from nitric acid, produce no change in a solution of pure bromide of potassium, while iodides are immediately decomposed, and the iodine separated may be recognized by shaking the liquid with starch or chloroform. Nitrite of potash and hydrochloric acid produce the same effect. The presence of chlorides does not interfere with this reaction any more than that of bromides. Grangé follows this method in testing mineral and other water for iodine, and even for its quantitative estimation. In this case the iodine is liberated by means of hyponitric acid, is separated from the liquid by chloroform, and the coloured solution treated with a solution of potash of known value, until the colour disappears, or else with nitrate of silver or chloride of palladium.

When chlorine, bromine, and iodine are to be estimated quantitatively in a liquid, it is first treated with hyponitric acid, the iodine separated by chloroform, the bromine, liberated by the addition of nitric and sulphuric acids, likewise dissolved out by chloroform, and, lastly, the chlorine precipitated by nitrate of silver. The bromine is also precipitated from its chloroform solution by nitrate of silver.

David Price applies the reaction between nitrites and iodide of potassium with hydrochloric acid to the detection of nitrous acid or of iodine. The liquid to be tested for iodine is mixed with starch, then with hydrochloric acid and a solution of nitrite of potash; when much iodine is present a dark blue colour is produced immediately, when it amounts to only two or three millionths the colour does not appear until after the lapse of some seconds.

With regard to the sensibility of the various tests proposed for iodine, that recommended by Price appears to be the best. Those of Grangé and Marchand likewise give very trustworthy results. From a comparative study of them I have arrived at the following conclusions:—

1. The method adopted by Chatin and Gaultier de Claubry, the use of a mixture of one part nitric acid, six parts sulphuric acid and starch powder, is only capable of indicating $\frac{1}{375000}$ of iodide of potassium by a very faint violet colour. Chatin states in his Memoirs, that, with a liquid containing rather more than one millionth of iodine, nitric acid produced a very characteristic blue, while sulphuric acid gave only a slight violet, and as I obtained only a faint violet colour by the application of pure nitric acid to a liquid containing $\frac{1}{375000}$ of iodide of potassium, there is some reason for the suspicion that this nitric acid contained iodine.

2. By the test proposed by Grangé $\frac{1}{500000}$ of iodide of potassium may be detected. Overbeck, who recommends this test, adds concentrated nitric acid to a small quantity of starch or sugar, in a test-tube, and applies the heat of a spirit lamp until a brisk evolution of gas commences. The gas is passed into the liquid to be tested for iodine which has been previously mixed with starch paste. He states that a blue colour is immediately produced by one millionth of iodide of potassium, and that subsequently the starch compound separates in the form of a tangible precipitate. I have not been able to confirm this degree of sensibility for a quantity less than $\frac{1}{500000}$ iodide of potassium.

3. Lassaigne's test, precipitation with nitrate of palladium, produces, in the presence of $\frac{1}{1000000}$ iodide of potassium, an intense colour, and after some time, a precipitate of iodide of palladium; with $\frac{1}{3000000}$ a decided yellow colour is produced, but no precipitate.

4. Rabourdin's method—treatment with a mixture of nitric and sulphuric acid, and addition of chloroform—indicates $\frac{1}{100000}$ of iodide of potassium by a distinct violet colour; with $\frac{1}{150000}$ the colour appears only after some time.

5. Marchand's process—treatment with chlorate of potash, hydrochloric acid, and dry starch—indicates $\frac{1}{300000}$ by a faint violet colour, which is somewhat more distinct than that produced by Grangé's test.

6. Price's method—treatment with nitrite of potash, hydrochloric acid, and starch—indicates $\frac{1}{1000000}$ of iodide of potassium by the production of a violet-red colour, which is almost as intense as that produced with $\frac{1}{500000}$ by the method of Grangé. This test has therefore the advantage of being the most sensitive of all.

Some experiments, made with a view to the quantitative estimation of chlorine, bromine, and iodine, by means of Grangé's method, showed that it was well adapted for this purpose.

After having satisfied myself that bromides and chlorides are not decomposed by hyponitric acid, and that their presence does not hinder its reaction with iodides, a mixed solution of iodide of potassium, bromide, and chloride of sodium, was first treated with hyponitric acid and shaken with chloroform. When, after standing for some time, the coloured chloroform solution had separated, it was carefully removed, washed with water, and mixed with a solution of potash of known value until decolourized. The remaining saline solution was then treated with a mixture of nitric and sulphuric acids, shaken with chloroform to separate the bromine, and the chlorine then estimated by precipitation with a nitrate of silver solution of known value. The experiments were made with 0.050 or 0.100 grm. iodide of potassium, the same quantity of bromide, and 1.000, 1.500, and 2.000 grm. of chloride of sodium; the results were as exact as could be expected. The difference in the results did not amount on the average to more than 0.006 for bromide and iodide of potassium, and for chloride of sodium 0.002 grm.

The method proposed by Moride* for the separation of these elements by means of benzin, is less advantageous for their quantitative estimation.

Penny's method of estimating iodide—by means of the reaction between soluble iodides, hydrochloric acid, and chromate of potash:

$$3\,KI + KO,\,2\,Cr\,O_3 + 7\,H\,Cl = I_3 + 4\,K\,Cl + Cr_3\,Cl_3 + 7\,HO.$$

is not to be recommended for general adoption, as it cannot be applied directly to the valuation of commercial iodine or kelp, for in the former case the iodine must be first converted into iodide of zinc, and in the latter the sulphurets, sulphites, hyposulphites, and sulphocyanides, must be previously separated.—*Jahrbuch für praktische Pharmacie, October*, 1853.

* *Comptes Rendus*, vii. 35, and *Chemical Gazette*.

MANUFACTURE OF SULPHATE OF QUININE.

Messrs. Thwaites' and Herapath's Patent (*Enrolled May* 15*th*, 1854).—The process is as follows :—112lbs. of coarsely powdered Peruvian bark are first boiled for one hour or more in a solution of carbonate of soda, made by dissolving 28lbs. of the carbonate in 56 gallons of water ; the effect of this preliminary process is to remove much of the useless colouring and extractive matter of the bark. The bark is afterwards pressed, then thrown into a vat or tub, and well agitated with cold water; by this means, more of the colouring and extractive matter is removed. The bark is then collected on a strainer and expressed dry, after which it is digested at about a temperature of 160° for one hour or more in a mixture of hydrochloric acid and water, formed by adding two fluid pints of acid to 50 gallons of water ; in this acid mixture the bark is kept well agitated. After boiling for a quarter of an hour, the acid liquor is run off, and the bark strained. This digesting and boiling of the bark in acidulated water is repeated a second and a third time. The weak acid solutions from the second and third boilings are kept for the purpose of exhausting fresh portions of bark. The strong acid solutions are heated very gently with excess of cream of lime, by which the quinine, quinidine, and cinchonine are thrown out of solution, and the liquor is allowed to cool.

To this mixture is then added fusel oil, turpentine, camphine, or other hydrocarbon insoluble in water and lighter than it ; the patentees giving the preference to fusel oil, which is used in the proportion of one pint for each gallon of acid solution, and the solution of the alkaloids is assisted by well agitating the mixture. By this process the alkaloids (or some of them only, according to the solvent employed) are dissolved ; and on repose, the solution will be found swimming on the top of the heavier watery fluid containing the chloride of calcium. The lighter fluid is then drawn off by means of a syphon, and repeatedly and thoroughly well agitated with a solution of six fluid ounces of sulphuric acid in fourteen gallons of water. By this process the alkaloids are transferred from the original solvent to the diluted sulphuric acid, and the quinine and other alkaloids become dissolved in the acid solution. The two fluids separate on repose in consequence of the great difference in the specific gravities, and should be separately syphoned off. The solvent having rendered up the alkaloids to the acid may again be used as a solvent for fresh portions of the alkaloids. The acid liquor containing the alkaloids in solution is now a concentrated mixed solution of sulphates of quinidine, quinine, and cinchonine, with slight excess of sulphuric acid and some colouring matter. The solution is next decolourized by boiling with animal or vegetable charcoal, taking the necessary precautions to prevent any loss.

The solution is then divided into two equal parts, to one of which is added a solution of caustic soda or ammonia, or a solution of the carbonates of soda or ammonia, in quantity sufficient to precipitate the alkaloids therein, without being employed in excess. The mixture is then added to the other half of the original solution, and boiled for one hour if necessary. If any grey alkaloid remains undissolved, dilute sulphuric acid is added cautiously, drop by drop; if crystals form during the boiling more water is added to dissolve them. This operation produces on cooling an abundant proportion of crystallized disulphate of quinine, mixed with some disulphate of quinidine, and usually some sulphate of cinchonine. Upon concentrating the solution by evaporation and then allowing it to cool, a large proportion of the two former substances may be recovered, and still more by a second and third repetition of the process of evaporation and crystallization. The produce of all these crystallizations being mixtures of the disulphates of the cinchona alkaloids, quinine, quinidine, and some cinchonine, should be purified by re-crystallization, or other process, in the usual manner, so as to render the article fit for the market. The quinine, quinidine, and cinchonine remaining in the mother liquors, should be extracted by precipitation with a solution of caustic soda, ammonia, potassa, or other suitable precipitant, and then agitated with fusel oil, turpentine, camphine, or other solvent, as before described.

The dark brown-red alkaline fluid obtained by the preparatory process of boiling with an alkali, is now to be mixed with the liquid (containing chloride of calcium) from which the alkaloids have been obtained by agitating with a solvent, and the deeply-coloured precipitated carbonate and other salts of lime and other impurities are allowed to subside, and should the liquid be still alkaline, or contain excess of

carbonate of soda, a solution of chloride of calcium should be added to precipitate the carbonic acid as carbonate of lime, which must be separated. The liquid separated (still containing chloride of sodium, the hydrochlorates of quinine, and other cinchona alkaloids) is then concentrated by evaporation if necessary, and heated with slaked lime or cream of lime, and the precipitated alkaloid removed by the addition of fusel oil, turpentine, or other solvent, and the alkaloids separated as before described.

The proportions of alkali, acids, &c., above indicated are those for Peruvian bark of fair average quality.

The above process is also applicable, with certain modifications named by the patentees, to the extraction of veratria and other alkaloids.

The patentees claim the use of fused oil, camphine, turpentine, or other hydrocarbons insoluble in water, in the manner described, for separating alkaloids from the liquid in which they are held in suspension or solution.

The above process of manufacturing quinine without alcohol appears to be similar to the undermentioned one.

Messrs. Pelletier and Despretz's Process for the Manufacture of Sulphate of Quinine (Patented in England, July 25th, 1833).—The principal object of the patentees is stated by them to be the production of sulphate of quinine, by means of *distilled or compressed oils*, whether derivable from *vegetable, animal, or mineral substances*, or matter as a substitute for, and without the aid of, alcohol. They then describe the following mode of obtaining sulphate of quinine:—When distilled oil is intended to be used, the bark having been treated by acids, and the quinine and other matters soluble in the acid having been precipitated by means of lime, in the usual method of making quinine, the calcareous precipitate is dried and reduced to a fine powder; it is then treated several times with the oil intended to be used, in suitable vessels. The patentees prefer the use of oil of turpentine. The oil is then to be separated by decantation or filtration.

When expressed oil is used, care must be taken that the lime be first extracted, otherwise an insoluble lime soap would be formed.

The precipitate is then dissolved in an acid, and the rough quinine precipitated by ammonia; when in this state, it is treated with oil several times which will dissolve the quinine, and separate all foreign matters therefrom.

After obtaining the quinine in solution by expressed or distilled oils, the oil is treated by water acidulated with any acid capable of forming a salt with the quinine (preference being given to hydrochloric acid), the acidulated waters separate the quinine from the oil, the separation being easily effected by decantation, as the two liquids, having different specific weights, will not combine. The quinine thus dissolved is precipitated by an alkali, and after that it is reduced to sulphate by uniting it to sulphuric acid, care being taken to effect a complete saturation, and decolourize the solution by means of animal charcoal; the sulphate is then crystallized by the method usually adopted.

There is another mode of separating the quinine when dissolved in distilled oils. This mode is by the application of heat in any of the known ways used in the separation of liquids; but the patentees consider this process less advantageous, and prefer treating the oil by acidulated water.

USE OF MUREXIDE IN DYEING.

Attempts have recently been made to communicate a purple colour to textile fabrics, by the production of murexide in their fibres. As yet they have been successful only in the case of wool.

The idea of using murexide for dyeing is not new, but the difficulty consisted in fixing it upon the fabric, and procuring the substance at a sufficiently cheap rate.

Dr. Sacc was induced by the fact that a solution of alloxan stained the skin purple, owing to the production of murexide, to try whether woollen cloth steeped in a solution of alloxan, would acquire a purple colour, and he found that this really is the case, the colour produced being far finer than that of cochineal.

M. A. Schlumberger adopts the following process:—The fabric to be dyed is soaked in a solution of alloxan (30 grms. to 1 liter), wrung, dried at a gentle heat, and after an ageing of twenty-four hours, the colour brought out by passing the cloth over a roller heated to 212° Fahr. The intensity of colour varies according to the

strength of the alloxan solution, and washing with cold water produces the full degree of brilliance.

M. Sacc found that the finest colours could only be communicated to fabrics mordaunted with persalts of tin. They obtained the best results with a solution of equal parts of perchloride of tin and oxalic acid, having a density of 1.006. Cloth freshly mordaunted gave better results than cloth which had been mordaunted for some time.

A committee was appointed by the Société Industrielle at Mulhausen to inquire into this subject, and they suggested that, as murexide is produced by the action of heat and ammonia upon alloxan, the cloth should be exposed to ammonia vapour after being treated with alloxan. By this means the ageing of the cloth is rendered unnecessary, and a saving of alloxan is effected, for this substance is liable to be decomposed by the traces of protochloride of tin or sulphurous acid, retained by the cloth after bleaching.

All attempts to fix the murexide purple upon cotton or silk have failed ; on wool, however, it is permanent.

Light appears to have little action upon murexide purple, which has the advantage over the colours produced from cochineal in being generally more solid and durable.

With regard to the sources whence alloxan—or uric acid, the substance from which it is derived—may be obtained, it may be observed that guano is rich in uric acid, and likewise the excrements of pigeons, carnivorous birds, and silkworms.

M. Schlumberger has indulged in some curious speculations relative to the existence of this colouring matter ready formed in nature, which it may be interesting to notice. M. Sacc has found that poultry, and especially birds with very brilliant plumage, such as the different parroquets, do not produce sensible traces of uric acid during their period of moulting, whilst the quantity is very large when their feathers are fully developed. The question naturally suggests itself, what becomes of the uric acid in the former case? May it not be transformed by some as yet unknown metamorphoses in the animal body into a substance like alloxan, capable of colouring the feathers? Murexide, as we have observed, is green by reflected light: a substance, then, which gives violet (red and blue) and green (yellow and blue) can undoubtedly produce all shades of colours which are made up of those three colours. How curious if it should hereafter be found that murexide was indeed the source of all the varied hues of birds' plumage ! Still further, it is chiefly those animals which have but one means of exit for their excrements, and who produce large quantities of uric acid, that exhibit a display of colouring. Thus, for example, we have the skin of the serpent and lizard, the scales of fish, the wings of butterflies, often coloured in the most gorgeous manner, whilst the skins of the mammalia are dull, and without that iridescence and metallic lustre which is so characteristic of the colouring of some of the classes of animals mentioned. These are, however, mere speculations, but they nevertheless lead to a very unexpected supposition. The ancients were acquainted with a process for dyeing wool of a fine purple, which has been lost to our days, or at least is only practised in the East. Tradition, however, tells us that this beautiful purple tint was produced by pounding a quantity of small shell-fish, and adding to the mass either a quantity of urine in the state of putrefaction, or water in which some of the same shell-fish had been allowed to putrefy. The cloth soaked in the liquid produced by these mixtures only developed the beautiful purple colour after long exposure to the air, and probably to heat. This mode of producing the colour so strikingly resembles that by which the new colour of murexide is produced, that one is tempted to believe that the Tyrian purple was produced by that substance, and that many centuries before the beautiful discovery of Liebig and Wöhler, murexide was formed by the action of ammonia, in the putrid matter employed, upon substances derived from the uric acid which would exist in the intestines of the shell-fish pounded up.—*Bulletin de la Société Industrielle de Mulhouse*, No. 123, p. 242 ; and *Dublin Journ. of Indust. Progress*, June, p. 173.

ON THE METAMORPHOSES OF SUGAR IN THE GENERAL PROCESS OF ANIMAL NUTRITION.

BY DR. F. J. V. BECKER.

Of the various known kinds of sugar, three are met with in the animal organism —glucose, lactin, and inosit. Since, however, the two latter are but small in amount, and are probably formed for the most part from glucose or protein substances, the author has confined his observations to glucose.

Behaviour of Sugar in the Intestinal Canal.—Although it is universally known that cane sugar, introduced into the organism, is converted into glucose, the opinions as to the seat of this change, and the means by which it is effected, are by no means concordant.

Bouchardat and Sandras affirm that cane sugar is converted into glucose by the gastric juice, and this is likewise inferred by Lehmann from the fact, that within an hour after injecting an aqueous solution of sugar into the æsophagus, he found only glucose, both in the stomach and intestines. On the other hand, Frerichs could not in any instance detect glucose with any certainty, even after digesting cane sugar with gastric juice for thirty-six hours. Frerichs has shown that saliva does not determine the conversion of cane sugar into glucose, and this has been confirmed by Lehmann. Although the author of the present memoir certainly agrees with the first named investigators as to the presence of glucose even in the stomachs of rabbits which have been fed with carrots, he considers that the conversion of cane sugar does not always take place in the stomach. Thus, for instance, he found in a cat, which after fasting for twelve hours was fed with 10 grm. of cane sugar and milk, and then killed an hour afterwards, no glucose above the centre of jejunum, while the stomach, duodenum and the anterior half of the jejunum contained only cane sugar. The aqueous extracts of the contents of each of these parts of the intestinal canal, treated with caustic potash and sulphate of copper, were blue and clear even after the lapse of forty-eight hours, and did not deposit red oxide of copper until boiled, while the extract from the entire remaining portion of the intestinal canal gave a deposit within three or four hours at the ordinary temperature. Now, as neither saliva nor gastric juice determine this metamorphosis of cane sugar, which may nevertheless take place in the stomach, there does not appear to be any other view admissible than that it is induced by the transformation of other substances, whose constituents are, so to speak, already in a state of motion. This would account for the fact, that in animals like the rabbit, whose stomachs are never empty, and consequently always contain substances in a state of chemical transformation, the conversion of cane sugar into glucose takes place more readily,—and even in the stomach,—than in animals with empty stomachs, as for instance, the above-mentioned cat.

It may be laid down as a general rule that the conversion of cane sugar into glucose commences in the anterior portion of the small intestines ; and in the most intimate connexion with this fact is the question, whether the sugar has to undergo any further change in the intestinal canal before being absorbed?

With regard to this point there are likewise very different opinions. Frerichs maintains that the sugar seldom reaches the small intestines, but passes from the stomach into the venous system, where, on account of the rapid absorption, a metamorphosis can scarcely be conceived. After feeding with milk, he found sugar in the small intestine in only two instances out of seven ; he does not, however, state how much milk the animals received, or how soon after feeding they were killed, although it is obvious that a knowledge of the quantity of food, and the time allowed for absorption, is essential for forming any opinion as to the seat and rapidity of the absorption. Consequently no great value can be attached to these observations.

Lehmann, on the contrary, could only in some instances detect traces of sugar in the blood of the vena portæ of horses which he had fed, during three days, with starch balls, and killed an hour after feeding. More frequently he found none. In the thoracic duct he likewise found only minute quantities. Moreover, Graham's researches have shown that the diffusibility of sugar is tolerably small, for while under otherwise similar circumstances, 58.7 parts of chloride of sodium diffuse, the quantity of sugar diffused is only 26.6. The numbers given by Jolly, as the endosmotic equivalents of these substances, agree with the diffusion results. He found the mean for chloride of sodium, 4.193 ; that for sugar, 7.157. Since, moreover, it has been ascertained that when the animals were killed an hour after the injection of 2 grm. of sugar, both sugar and an acid reaction was detected, even as far as the cœcum. Lehmann considered it necessary to infer that the sugar is, at least, for the greater part converted into an acid in the intestines before passing into the blood. But with regard to the formation of sugar in the liver, which Lehmann has placed beyond all question, by his admirable researches upon the blood from the hepatic artery and vena portæ, he expresses some doubt as to the non-absorption of sugar from the intestinal canal. For as there is a productive source of sugar within the animal organism, whence this substance can be transferred directly into

the blood, the importance of this substance is sufficiently evident, and it would be somewhat remarkable if it could not be absorbed directly from the intestinal canal into the fluids of the system. But that this direct absorption really does take place, the author believes he has obtained adequate proof by his researches.

The experiments made for the purpose of ascertaining *whether sugar passes unaltered from the intestinal canal into the blood* were of three kinds:—*a. Injection of sugar solution into the intestine.* For this purpose the animal was fastened to a bench with the belly upwards, the hair shaved off the left side, and an ordinary surgical bandage passed round the breast and lower part of the body. An incision was then made in the skin about an inch from the left kidney, towards the linea alba, and as far below the last false rib. The epigastric integuments were cut through, the peritoneum opened and an intestine forced out by gentle pressure, when it did not protrude spontaneously. Generally speaking, the ileum is met with here; the jejunum lies more towards the back. A ligature was applied to the intestine, but in such a manner, that the vasa mesentrica were not included, which admitted of the assimilative process going on unhindered; the contents of the intestine were pressed gently forwards, and after a portion of the intestine had been emptied, a ligature was applied. A third ligature was applied loosely, quite close to the first one, a small incision made in the intestinal membrane, and the pipe of an injection syringe, graduated into cubic centimeters, introduced through the loose ligature, which was then tightened, the solution of sugar forced into the intestine, the syringe withdrawn, the tied intestine again replaced and the wound closed by a few sutures. The loss of blood was generally small. The animals did not appear much affected after the operation, some began to eat very soon after. In three or four hours they were killed by a blow on the neck, and the contents of the intestine, the blood, urine, and sometimes other parts examined for sugar, by means of Trommer's test.

The blood was generally taken from the cavity of the breast, and the heart, diluted with about four volumes of water, the coagula cut up, a slight excess of acetic acid added, and the whole boiled until the albumen coagulated; the clear filtered liquid was then tested for sugar.

The contents of the intestine and the urine were at once treated with caustic potash and sulphate of copper, and filtered, one part of the filtrate boiled, and the other allowed to stand, in order to see whether suboxide of copper was precipitated.

In forty-three instances out of fifty-three, unquestionable indications of sugar were found in the blood, and in one of the remaining ten, it must have passed through the blood as it was found in the urine.

An objection might be made to any inference from the above series of experiments, to the effect that sugar was introduced into the blood in larger proportion than usual, because the excess could not be otherwise disposed of, and to meet this objection the following experiments were made:—

b. Injection of Sugar Solution into the Stomach.—The Author describes three experiments, from which it follows, that sugar may be transferred as such from the intestines into the blood, and in such quantity, that it is again excreted by the kidneys. An experiment made by Schmidt agrees with these. He injected 50 grm. of sugar, dissolved in twice as much water, into the stomach of a young cat, and although a large portion was thrown up, the urine, after the lapse of twenty-five minutes, contained traces of grape sugar, and larger quantities afterwards. In another experiment he found that cane sugar, when absorbed in large quantity, may pass unaltered, not only through the vena portæ, where it was detected by Bernard, but also the entire system.

c. Abundant Supply of Food rich in Sugar.—It then remained to prove that the proportion of sugar in blood may be increased by food containing much sugar; and in that case, whether animals voluntarily partake of it in such quantity that sugar passes into the urine, as has been asserted by B. Polli.

A young rabbit was fed during three days solely upon carrots, another was fed during the same time upon oats, and a third was kept without food for twenty-six hours and then killed.

The results showed that the quantity of sugar in the blood may be increased by an abundant supply of sugar in the food. With regard to the passage of sugar into the urine in a normal state, the author only once found traces of sugar in the urine of a very voracious rabbit, fed solely upon carrots. It must, however, be noticed, that this animal's brain had been punctured about six days previously although without

any result. In no instance has the author observed the appearance of sugar in the urine of healthy animals after voluntary consumption of food rich in sugar.

After having thus proved the direct passage of sugar into the blood, it was important to ascertain the law of the absorption of sugar from the intestinal canal, especially as we were not in possession of any knowledge of the quantitative relations of absoption generally.

With this view, a number of experiments were made, by injecting into the tied intestine a measured quantity of solutions containing different proportions of sugar. The operation was performed in exactly the same manner as that previously described. The animals were killed a certain time after the injection, and the contents of the intestine examined quantitatively. The difference between the quantity of sugar found and that injected gave the amount of absorption.

The best mode of estimating the sugar was found to be the following: The contents of the tied portion of the intestine were emptied into a basin and boiled with a few drops of tartaric acid. When cold, the liquid was introduced into a Fresenius carbonic acid apparatus, yeast added, and the carbonic acid disengaged during fermentation estimated. As a confirmation of the result, the liquid was then tested in order to ascertain whether any sugar remained.

The author infers from the experiments made with equal quantities of liquid :—

1. That the extent of intestine absorbing the sugar solution must bear a certain proportion to the quantity of sugar;

2. The absorption of sugar solution is in direct proportion to the degree of concentration.

The absorption appears to be greater at first, that is, while the liquid is most concentrated and subsequently to decrease.

The author considers that the absorption of sugar from the intestinal canal is a purely osmotic phenomenon.

When it is remembered that the villi are enveloped in a fine capillary network of veins, it will, at once, be evident what are the organs between which this interchange of liquid and sugar takes place. It is by these thin walled capillaries, which come into such close contact with the contents of the intestines, that the blood principally discharges water in order to take up sugar. While the sugar solution is concentrated, the conditions are most favourable to the interchange between it and the intercellular liquid of the blood.

Formation of Acid in the intestine after taking Sugar.—In numerous instances, the author observed an acid reaction at two parts of the digestive apparatus—the stomach and the cœcum. According to the quantity of sugar taken and the time elapsed, it extends more or less into the small intestine. Generally, this acid reaction ceases at the commencement of the jejunum, and is there succeeded by an alkaline reaction extending as far as the cœcum. The contents of the cœcum, on the contrary, are always acid.

With regard to the acid reaction in the stomach, after taking sugar, it may be referred to a greater secretion of gastric juice, which Lehmann has observed in dogs with fistula in the stomach. This opinion is likewise recognized by Frerichs. The author's experiments, do not confirm the statement of the latter investigator, that in the intermediate and lower portions of the small intestine free lactic acid is formed from the hydrates of carbon, for he found these parts had an acid reaction only when the whole higher portion of the intestinal canal had an acid reaction.

(*To be continued.*)

ABSTRACT OF THE BAKERIAN LECTURE, "ON OSMOTIC FORCE."

BY PROFESSOR GRAHAM.

This name was applied to the power by which liquids are impelled through moist membrane and other porous septa in experiments of endosmose and exosmose. It was shown, that with a solution of salt on one side of the porous septum and pure water on the other side (the condition of the osmometer of Dutrochet when filled with a saline solution and immersed in water), the passage of the salt outward is entirely by diffusion, and that a thin membrane does not sensibly impede that molecular process. The movement is confined to the liquid salt particles and does not influence the water holding them in solution, which is entirely passive; it

requires no farther explanation. The flow of water inwards on the other hand affects sensible masses of fluid, and is the only one of the movements which can be correctly described as a current. It is osmose and the work of the osmotic force to be discussed.

As diffusion is always a double movement, while salt diffuses out, a certain quantity of water necessarily diffusing in at the same time in exchange, diffusibility might be imagined to be the osmotic force. But the water introduced into the osmometer in this way has always a definite relation to the quantity of salt which escapes, and can scarcely rise in any case above four or six times the weight of salt, while the water entering the osmometer often exceeds the salt, leaving it at least one hundred times. Diffusion, therefore, is quite insufficient to account for the water current.

The theory which refers osmose to capillarity appears to have no better foundation. The great inequality of ascension assumed among aqueous fluids is found not to exist, when their capillarity is correctly observed; and many of the saline solutions which give rise to the highest osmose are indistinguishable in ascension from pure water itself.

Two series of experiments on osmose were described, the first series made with the use of porous mineral septa, and the second series with animal membrane. The earthenware osmometer consisted of the porous cylinder employed in voltaic batteries, about five inches in depth, surmounted by an open glass tube 0.6 inch in diameter, attached to the mouth of the cylinder by means of a cup of gutta percha. In conducting an experiment the cylinder was filled with any saline solution to the base of the glass tube, and immediately placed in a large jar of distilled water; and as the fluid within the instrument rose in the tube, during the experiment, water was added to the jar, so as to prevent inequality of hydrostatic pressure. The rise (or fall) of liquid in the tube was highly uniform, as observed from hour to hour, and the experiment was generally terminated in five hours. From experiments made on solutions of every variety of soluble substances, it appeared that the rise or osmose is quite insignificant with neutral organic substances in general, such as sugar, alcohol, urea, tannin, &c.; so also with neutral salts of the earths and ordinary metals, and with chlorides of sodium and potassium, nitrates of potash and soda, and chloride of mercury. A more sensible but still very moderate osmose is exhibited by hydrochloric, nitric, acetic, sulphurous, citric and tartaric acids. These are surpassed by the stronger mineral acids, such as sulphuric and phosphoric acid and sulphate of potash, which are again exceeded by salts of potash and soda possessing either a decided acid or alkaline reaction, such as binoxalate of potash, phosphate of soda and carbonates of potash and soda. The highly osmotic substances were also found to act with most advantage, in small proportions, producing in general the largest osmose in the proportion of one quarter per cent. of salt dissolved. Osmose is indeed eminently the phenomenon of weak solutions. The same substances are likewise always chemically active bodies, and possess affinities which enable them to act upon the material of the earthenware septum. Lime and alumina were accordingly always found in solution after osmose, and the corrosion of the septum appeared to be a necessary condition of the flow. Septa of other materials, such as pure carbonate of lime, gypsum, compressed charcoal, and tanned sole-leather, although not deficient in porosity, gave no osmose, apparently because they are not acted upon chemically by the saline solutions, capillarity alone was manifestly insufficient to produce the liquid movement, while the *vis motrix* appeared to be chemical action.

The electrical endosmose of Porrett, which has lately been defined with great clearness by Weidemann, was believed to indicate the possession of a peculiar chemical constitution by water, while liquid, or at least the capacity to assume that constitution when water is polarized and acting chemically upon other substances. A large but variable number of atoms of water are associated together to form a liquid molecule of water, of which an individual atom of oxygen stands apart, forming a negative or chlorous radical, while the whole remaining atoms together are constituted into a positive or basylous radical, which last will contain an unbalanced equivalent of hydrogen, giving the molecule basicity, as in the great proportion of organic radicals. Now, it is this voluminous basylous radical which travels in the electrical decomposition of pure water, and resolves itself into hydrogen gas and water at the negative pole, causing the accumulation of water observed there, while the oxygen

alone proceeds in the opposite direction to the positive pole. Attention was also called to the fact that acids and alkalies, when in solution, are chemically combined with much water of hydration ; sulphuric acid, for instance, evolving heat when the fiftieth equivalent of water is added to it. In the combination of such bodies, the disposal of the water is generally overlooked. Osmose was considered as depending upon such secondary results of combination, that is, upon the large number or voluminous proportions of the water molecules involved in such combinations. The porous septum is the means of bringing out and rendering visible, both in electrical and ordinary osmose, this liquid movement attending chemical combinations and decompositions.

Although the nature and *modus operandi* of the chemical action producing osmose remains still very obscure, considerable light is thrown upon it in the application of septa of animal membrane. Ox bladder was found to acquire greatly increased activity, and also to act with much greater regularity when first divested of its outer muscular coat. Cotton calico also impregnated with liquid albumen, and afterwards exposed to heat so as to coagulate that substance, was sufficiently impervious, and formed an excellent septum, resembling membrane in every respect. The osmometer was of the usual bulb-form, but the membrane was supported by a plate of perforated zinc, and the instrument provided with a tube of considerable diameter. The diameter of the tube being one-tenth of that of the mouth of the bulb or the disc of membrane exposed to the fluids, a rise of liquid in the tube, amounting to 100 millimètres, indicated that as much water had permeated the membrane and entered the osmometer, as would cover the whole surface of the membrane to a depth of one millimètre, or one-twenty-fifth part of an inch. Such millimètre divisions of the tube become degrees of osmose, which are of the same value in all instruments.

Osmose in membrane presented many points of similarity to that in earthenware. The membrane is constantly undergoing decomposition, and its osmotic action is exhaustible. Further, salts and other substances, capable of determining a large osmose, are all chemically active substances, while the great mass of neutral monobasic salts of the metals, such as chloride of sodium, possess only a low degree of action, or are wholly inert. The active substances are also relatively most efficient in small proportions.

When a solution of the proper kind is used, the osmose or passage of fluid proceeds with a velocity wholly unprecedented in such experiments. The rise of liquid in the tube with a solution containing one-tenth per cent. of carbonate of potash in the osmometer, was 167 degrees or millimètres, and with one per cent. of the same salt, 206 deg. in five hours. With another membrane and stronger solution, the rise was 863 millimètres, or upwards of 30 inches in the same time, and as much water therefore was impelled through the membrane as would cover its whole surface to a depth of 8.6 millimètres, or one-third of an inch. The chemical action must be different on the substance of the membrane at its inner and outer surfaces to induce osmose ; and according to the hypothetic view which accords best with the phenomenon, the action on the two sides is not unequal in degree only, but also different in kind. It appears as an alkaline action on the albuminous substance of the membrane, at the inner surface, and as an acid action on the albumen at the outer surface. The most general empyrical conclusion that can be drawn is, that the water always accumulates on the alkaline or basic side of the membrane. Hence, with an alkaline salt, such as carbonate or phosphate of soda in the osmometer, and water outside, the flow is inwards ; but with an acid in the osmometer, on the contrary, the flow is outwards, or there is negative osmose, the liquid then falling in the tube. In the last case the water outside is basic when compared with the acid within, and the flow is therefore still towards the base. The chloride of sodium, chloride of barium, chloride of magnesium, and similar neutral salts are wholly indifferent, or appear only to act in a subordinate manner to some other active acid or basic substance, which last may be present in the solution or membrane in the most minute quantity. Salts which admit of dividing into a basic subsalt and free acid exhibit an osmotic activity of the highest order. Such are the acetate and various other salts of alumina, iron, and chromium, the protochloride of iron, chloride of copper and tin, chloride of copper, nitrate of lead, &c. The acid travels outward by diffusion, superinducing a basic condition of the inner surface of the membrane, and an acid condition of the outer surface, the favourable condition of a high positive osmose. The bibasic salts of potash and soda again, such as the sulphate and tartrate of

potash, although strictly neutral in properties, begin to exhibit a positive osmose, in consequence, it may be presumed, of their resolution into an acid supersalt and free alkaline base.

The following table exhibits the osmose of substances of all classes :—

Osmose of 1 *per cent. Solutions in Membrane.*

Oxalic acid	—148. deg.	Chloride of zinc	54. deg.
Hydrochloric acid	— 92.	Chloride of nickel	88.
Terchloride of gold	— 54.	Nitrate of lead	125 to 211.
Bichloride of tin	— 46.	Nitrate of cadmium	137.
Bichloride of platinum	— 30.	Nitrate of uranium	234 to 458.
Chloride of magnesium	— 3.	Nitrate of copper	204.
Chloride of sodium	+ 2.	Chloride of copper	351.
Chloride of potassium	18.	Protochloride of tin	289.
Nitrate of soda	2.	Protochloride of iron	435.
Nitrate of silver	34.	Chloride of mercury	121.
Sulphate of potash	21 to 60.	Protonitrate of mercury	356.
Sulphate of magnesia	14.	Pernitrate of mercury	476.
Chloride of calcium	20.	Acetate of sesquioxide of iron	194.
Chloride of barium	21.	Acetate of alumina	280 to 393.
Chloride of strontium	26.	Chloride of aluminum	540.
Chloride of cobalt	26.	Phosphate of soda	311.
Chloride of manganese	34.	Carbonate of potash	439.

It may appear to some that the chemical character which has been assigned to osmose takes away from the physiological interest of the subject, in so far as the decomposition of the membrane may appear to be incompatible with vital conditions, and that osmotic movements must therefore be confined to dead matter; but such apprehensions are, it is believed, groundless, or, at all events, premature. All parts of living structures are allowed to be in a state of incessant change, of decomposition and renewal. The decomposition occurring in a living membrane, while effecting osmotic propulsion, may possibly, therefore, be of a reparable kind In other respects chemical osmose appears to be an agency particularly adapted to take part in the animal economy. It is seen that osmose is peculiarly excited by dilute saline solutions, such as the animal juices really are, and that the alkaline or acid property which these juices always possess is another most favourable condition for their action on membrane. The natural excitation of osmose in the substance of the membranes or cell-walls dividing such solutions seems, therefore, almost inevitable.

In osmose there is further a remarkably direct substitution of one of the great forces of nature by its equivalent in another force—the conversion, as it may be said, of chemical affinity into mechanical power. Now what is more wanted in the theory of animal functions than a mechanism for obtaining motive power from chemical decomposition as it occurs in the tissues. In minute microscopic cells the osmotic movements being entirely dependent upon extent of surface, may attain the highest conceivable velocity. May it not be hoped, therefore, to find in the osmotic injection of fluids the deficient link which certainly intervenes between muscular movement and chemical decomposition ?

Proceedings of the Royal Society, June 15, 1854.

PREPARATION OF CUBEBIN.

W. Englehardt* has examined a crystalline deposit from an ethereal infusion f cubebs, which had been kept for some months in a well-closed vessel, and found it to consist of cubebin. However, as cubebin is almost insoluble in ether at the ordinary temperature, it was very probably dissolved by the oils extracted by the ether. In the preparation of this substance according to the general method, there would consequently be a considerable loss resulting from the extraction with ether previous to dissolving the cubebin in alcohol.

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* *Neues Repertorium für Pharmacie*, No. 1, 1854.

SIMPLE METHOD OF ASCERTAINING THE PURITY OF JALAP AND SCAMMONY RESINS, AND OF DETECTING THEIR ADULTERATION.

BY A. BUCHNER.

The chemical examination of jalap resin has shown that it consists principally of rhodeoretin, a substance insoluble in ether, and convertible, by the action of alkalies, into an acid soluble in water rhodeoretinic acid. The portion soluble in ether behaves in a similar manner, for when jalap resin is dissolved in potash solution by the aid of heat, and the liquid treated with dilute sulphuric or hydrochloric acid, no actual precipitate is formed.

This behaviour admits of being applied to indicate the purity of the commercial resin, because the usual adulterating substances, fir resin, colophony, guaiacum, &c., are precipitated from their alkaline solutions by acids. When therefore a small quantity of the resin in question is dissolved in dilute potash, the production of a precipitate in the liquid on the addition of dilute sulphuric acid, indicates the presence of some such adulterating substance.

The substitution of resin from the roots of *ipomea orizabensis* for true jalap resin, cannot be detected by this test, because that resin behaves in a manner similar to rhodeoretin. It is, however, completely and readily soluble in ether, while jalap resin is for the most part insoluble.

Scammony resin is likewise converted by alkalies into a substance very soluble in water, and consequently not precipitable by acids. This behaviour may therefore serve to indicate its purity. The potash solution of the resin requires to be filtered before the addition of acid, and the experiment succeeds better when the scammony is first dissolved in alcohol decolourized by charcoal, and the test applied to the residue left on evaporating the clear liquid.—*Neues Repertorium für Pharmacie* No. 1, 1854.

LOCAL ORGANISATION.

BY MR. GEORGE BURRELL.

In the Journal for November last I took the liberty of suggesting the formation of local unions with the secretaries and representatives at the general meetings, a suggestion which I was happy to see met with your approval. I think it is obvious that, until we are knit together more closely by a community of interests and feelings, we will be, to all intents and purposes, non-existent as a society. Every country Member who takes an enlightened view of his position, and is honestly desirous to lend his aid in making his profession more respectable and more respected, knows he could do more towards that end than by merely contributing his guinea and exhibiting his certificate of membership. He needs opportunities to meet his brethren for free interchange of opinions, for the cultivation of friendly feelings, and to give and receive advice when such can be given with absolute disinterestedness. There are many matters of importance which it would be desirable to ventilate by free discussion. For example, it would be of great importance to collect accurate statistics as to the number of Druggists, *irregular* as well as regular; the proportion they bear to the population of the various localities; the different circumstances determining retail prices; the number of apprentices, &c., &c. Such statistics I am sure each Member would cheerfully lend his aid to collect, and they would be of great value as a means of avoiding that plethora of Druggists, which is unfortunately too common in some districts, where we see one comfortable business converted into two or three half-starved ones, and where one druggist who does little business employs his abundant leisure in reconnoitering the shop of his rival, who does somewhat more. By extending our acquaintance with each other, and by a regular and systematic intercourse with the metropolitan bodies, there would be soon engendered among country Members an enlightened *esprit de corps*, which would do more to raise us in public estimation than a hundred Acts of Parliament. And certainly upon no class would frequent friendly collisions produce a more beneficial effect than upon us. For the fagging, nose-grinding nature of our calling is by no means calculated to awaken in our bosoms very lofty intellectual aspirations; on the contrary, its tendency is, by exacting a constant and exaggerated attention to minute details, to contract the mind. This, together with the isolated position of most of us, has hitherto caused us to be regarded as mere vendors of physic, and

prevented us from taking that position in the scale of professions to which we are undoubtedly entitled. Hence the need of a higher education, both to counteract the benumbing influence of our *monkish* pursuits, and to enable us to follow out a distinct walk in the wide domain of science. Unfavourable comparisons have often been instituted between us and the continental pharmaceutists. I confess, I am no admirer of continental customs or notions as contrasted with our own, for we have higher political and social privileges, the possession of which reconciles me to the fact of science not being with us a kind of state religion as it is in France. I admit that the continental pharmaceutists are *educationally* higher than we are; but I deny that they are by natural endowment or social position better fitted to cultivate and advance science than ourselves. And it should not be overlooked by those who admire everything foreign, that the higher position occupied by the pharmaceutist on the continent, is at the cost of a considerable amount of personal freedom, it being characteristic of *paternal* despotism to keep its subjects wrapped in swaddling bands from their first to their *second* childhood. Our brethren on the continent are under the direct surveillance of government, which controls them in every thing, including prices as well as quality of drugs. I question if any Member of our Society would barter his personal freedom for a bit of tawdry ribbon, or for privileges, however valuable or exclusive; and I question also if the British public would regard a dose *endorsed* by a despot as more palatable and efficient than one guaranteed by British intellect and British morality.

It is a wretched and pitiful view of the subject to suppose that by giving the Pharmaceutist a higher education you tempt him to infringe on the province of the higher grades of the profession. For every intelligent man knows that our profession affords abundant field for the exercise of the highest talent if properly applied, a fact which men who aim at the *profitable* as their *summum bonum* cannot understand.

When we consider the number of illiterate men who unite the sale of drugs with everything saleable—from musk to old iron—and who can *without* the philosopher's stone convert ordinary drugs into the most rare and costly; and when the idea of Druggist is somehow associated with embalmed tape-worms as long as the sea-serpent, it is not surprising that the public generally should regard us as incongruous compounds of quack and trader.

Now I conceive the only way of removing that prejudice and assuming our true position as *the link between science and commerce*, is by a determined and continuous effort to raise ourselves *individually* in the first place, and as a *society* in the next.

The *first* object may be secured by studying ourselves and giving every facility to our young men to study; and the *second* by some mode of organisation similar to that which I suggested. We shall soon need every accessory to maintain even our present position, for we are surrounded by those who try to supplement their incomes by a cool appropriation of our articles of trade. Every one knows that most of the medicines in popular demand enter invariably into a grocer's stock, and that the linendrapers have become smitten with the same *communistic* notions, although as yet they chiefly confine themselves to the fancy soap and perfumery department.

In fact, the traditional fallacy about the enormity of our profits has made us the prey of every half-starved trade, with the exception, probably, of the Spitalfields weavers. Like the flying-fish, whose existence is spent in fleeing from its enemies, it no sooner escapes the hungry maw of its finny foes by emerging into another element than it is pounced upon by some dinner-less sea-fowl—so in like manner are our profits nibbled at by a higher class of rivals, whom it would be treason to name, and bolted outright by the lower and hungrier troops of grocers and haberdashers. This state of things has doubtlessly tempted many of our Members to retaliate in kind upon the aggressors; the consequence being that several articles have been added to Druggists' stocks which can scarcely be considered legitimate. Nor is it to be wondered at; for a man cannot be much of a *purist* who sees his returns "becoming small by degrees and beautifully less," and knows the cause of it. There can be no doubt that by more frequent intercourse with each other, and by accustoming ourselves to look at things beyond our own narrow spheres, many irregularities may be rectified, and others avoided. I hope the new Council will turn their attention to the subject of this paper, and will devise some mode of raising the Society out of its present *nebulous* condition.

Montrose, May 16th, 1854.

WHAT IS A FLUID POUND?

TO THE EDITOR OF THE LANCET.

Sir,—I take the liberty of addressing this letter to your Journal, which I trust you will be kind enough to insert, as it is on a subject which the medical profession should be duly informed of. It is with respect to the fluid pound as ordered in prescriptions, being dispensed in two different ways, namely 16ozs, and, more properly, 12ozs. As an instance of this, there are two respectable establishments, situated east and west of London, dispensing, on an average, sixty to seventy prescriptions (per diem) differing in dispensing the pound; but, unfortunately, this system does not rest in the two establishments, but in fact, is universal, and the evils of such a want of uniformity in dispensing are two—to increase or diminish the dose of the medicine prescribed.

There ought not to be the slightest doubt on such a material point as "Weight." Whether it be dry or fluid, Apothecaries' weight only should be recognised; all Pharmaceutical preparations are prepared by Apothecaries' weight—why not prescriptions? Speaking from my experience, I will mention, that I have been engaged east and west of London, and I have dispensed prescriptions where the ℔ j. has been ordered (say of Mistura Ferri Comp.) in both ways, though opposed to my own knowledge of its correctness. It is needless to say, that you are compelled to conform to customs of establishments—to follow in their steps whether right or wrong, and I, knowing this to be the case, have, on accepting a fresh engagement, made it my duty to ask the question, whether they send out 12 ozs. or 16 ozs. for the fluid pound. The existence of such want of system as this must be viewed in a most serious light, and to prevent these errors taking place, has been my motive for writing this letter—cautioning the medical profession against using the ℔ j. (as it admits of two different weights). I am perfectly satisfied the fault is not the dispenser's, but arises from a wrong system in establishments, which requires to be removed, to prevent these errors being, as they are, so often committed. I am, &c.,

An Experienced Dispenser.

[This subject was alluded to in a letter by Mr. James Murdock, of Glasgow (vol. xiii., page 104), and we have on several occasions pointed out the necessity of discarding the term fluid pound altogether, as the *only remedy* for the existing ambiguity. On inquiring of medical men what they mean by the term we have generally been told 16 oz., not on any authority, but from habit; because formerly the *fluid pound* and the *fluid pint* were used as synonymous terms for 16 oz. But when the pint was increased to 20 oz. the pound was left to stand alone, until some persons made the matter worse by reducing it to 12 oz., for which we have seen no authority.—Ed.]

SUGGESTIONS TO THE COUNCIL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir—As "a house divided against itself cannot stand," and supposing that you would like to see the general body of "Chemists and Druggists" like "a city that is at unity in itself," I beg to offer a few remarks which I consider have a tendency to produce such a result.

In the first place it may be contended, and must be allowed, that all who entered the business originally did so upon the same legal basis, and having done so, were entitled to a fair and equitable consideration. That they were not all similarly qualified is an argument which will equally hold good as respects such as have undergone an examination, leaving out of consideration natural capacity or aptitude, which differs in every individual.

Without going back, then, to the "Rights of Man," we may yet fairly put forward the rights of the tradesman. These acknowledged, who shall say that every one may not, and ought not, to pursue such a course and advocate such principles as he believes good for himself and not injurious to others, and abstain from or oppose what he considers either the reverse or indifferent, without other restraint or dictation than such as the laws of society and morality may supply. And such must and will always be the case to a great extent. Men—that is, all men—are not to be

enticed after a leader like sheep, or goaded forward as bullocks ; and as with these, so with them, the voice of a faithful shepherd, who will not betray into the hands of the butcher or the prospect of fresh pasture, is more efficacious than any other means. But to pursue the matter in question. Having embarked and obtained a vested right in the business, no external circumstances should be allowed to interfere between that right and its exercise, nor can such be without endangering that respect for the laws which is so essential to the well being of every state and society. If, therefore, any change is thought desirable, there will always be those desirous of progress ready and willing to undertake it when the time and circumstances are favourable ; and those really desirous of progress for its own sake, will not desire a lukewarm support from unwilling hands, but carve out and pursue undaunted their own best course ; neither will they halt about the benefit which may accrue to others from their efforts, but rather rejoice in the greatest scope which they can obtain for them. A reverse policy is also as sure to defeat itself, as that disinterested effort is, like virtue, its own reward. If, therefore, the assistance of others cannot be gained by persuasion, it should be commanded only by success, for if by taking steps we demonstrate the right of free action which we consider ourselves entitled to, what ground have we upon which to found objections to its exercise in others ? and if our efforts are for good, we may leave them to have their due and sure effect upon the self-interest and common sense of mankind. Again, allowance must be made for the fear which many, and not unjustly, have of being made use of merely when any movement is in progress, and difference of opinion, which must exist in common with the desire that each has to see his own promoted.

An overbearing course, therefore, is not right or desirable, and can only be pursued at risk to the operator and dissatisfaction to those affected thereby. How far these premises, which, if incorrect, are open to refutation, have been acted upon or disregarded in the proceedings of the Pharmaceutical Society, is not now questioned, but what may place it in harmony with discordant and scattered elements, and so increase its and their own strength and usefulness.

For this purpose, mutual good feeling and consideration are all that are necessary. Those who have belonged to the Society have always received ample benefit from it in return for their subscriptions, and have *thus* acquired no right to dictate terms to others except as to joining the said Society. Let the Members impose such terms for this purpose as they choose, but leave it optional with others to avail themselves of the opportunity afforded of accepting them. Let an examination qualify for carrying on business, irrespective, as it certainly ought, of belonging to a scientific society, which would be better for both, as not funds merely, but scientific taste and desire for knowledge are most conducive to the good of the former, while an almost entire absence of these is quite compatible with ample success in the latter. Things would thus be upon a right footing, and the credit due to the Society would be given where it ought and was due, and a stimulus would be given to improvement in order to admission within its ranks, which must be wanting while such is a matter of course. Let an amended act be obtained, including all in business as entitled to be registered, on payment of a moderate fee to pay the necessary expense, and no more, thus casting into oblivion all past differences, the act to prohibit the preparation of medicine, and anything with respect thereto beyond the mere sale of drugs, which would not pay, and leave the Membership of the Society as an optional and after consideration.

These proposals are firmly believed to be absolutely and only necessary, and being made in good faith are left to produce what effect they may be able.

I remain, Sir, yours obediently,

London, June 1st, 1854. CHARLES SAMUEL.

[We publish the above, not as containing any novelty, but because it describes concisely the principles and policy on which the Society was formed, and on which the Council have acted. Membership is optional as it has always been. Any person on proving that he is duly qualified as the Act directs, may be a Pharmaceutical Chemist without becoming a Member of the Society. In reference to the suggestion to obtain an amended Act, we think it would be more prudent to settle all differences among ourselves, before making any further appeal to the legislature.—ED.]

Westminster, June 22, 1854.

COURT OF QUEEN'S BENCH.

Before Lord Chief Justice Campbell and a Special Jury.

THE QUEEN *v.* THE REGISTRAR OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

(Counsel for the Prosecution Sir F. Kelly, Mr. Macaulay, and Mr. Lloyd; for the Defence The Attorney-General, Mr. Bramwell, and Mr. Brewer).

The Attorney-General—May it please your Lordship, gentlemen of the jury, this is a proceeding to try the validity of a return made by the defendant, who is the Registrar of the Pharmaceutical Society of Chemists, or the Society of Pharmaceutical Chemists in Great Britain, to a writ of mandamus, that is, a writ from this Court, which commands him to make out a list or register of persons entitled to be Pharmaceutical Chemists under the terms of a certain Act of Parliament, to which I shall call your attention immediately. Now the return which has been made by the Registrar of the Society, in obedience to the writ, is, that he has already made and maintained a register according to the terms of the Act.

This question, gentlemen, arises upon a dispute which has taken place among certain Members of this Society, as to the right of a particular body of individuals to be inserted on the list of Members of this Society, and to be treated as Members of it. The Society of Pharmaceutical Chemists in Great Britain was, I think, established in 1842, and was incorporated by Royal Charter in the year 1843. According to the terms of that Charter four classes of persons were entitled to be admitted as Members of the Pharmaceutical Society: firstly, those who were then established in business on their own account; secondly, persons who should be examined in such manner as the Council of the Society should deem proper, and, having been examined, should be admitted on such examination; thirdly, persons who should be certified to be duly qualified for admission as Members; and, fourthly, persons elected as superintendents by the Council of the Society. Those were the four classes who, according to the Charter, were admissible as Members of the Society of Pharmaceutical Chemists. In the year 1851 the Council made certain bye-laws, which they were enabled to make by virtue of their Charter, and under these bye-laws they limited the number of persons who were eligible without examination, not having been established on their account at the time of the Charter, but who came under the third category, namely, persons who should be certified to be duly qualified. They limited the number of this third body to such persons as had been Associates of the Society admitted before 1st July, 1842, and persons established on their own account as Chemists and Druggists on or before 18th February, 1843. Therefore, according to those bye-laws it was necessary that persons should have been in business at a certain period, or that they should have been Associates of the Society at a given period, or that they should undergo an examination.

So things remained until the year 1852, when an Act of Parliament was passed, which had for its purpose to confirm the Charter and make certain new regulations and enactments with regard to the Society. I will call your Lordship's attention to that Act of Parliament in a moment. Subsequently to the passing of that Act of Parliament the Council made new bye-laws, and those bye-laws have somewhat modified the bye-laws of 1851. They made those bye-laws in November, 1852, which modified in the manner I will point out to you the previous bye-law of 1851. It is in these terms:—"Chemists and Druggists who commenced business on their own account after the date of the Charter, and prior to the passing of the Act, 15th and 16th Victoria, c. 56, 30th June, 1852." That is the Act of Parliament I have just been referring to, to which I will go back presently. "And who shall, before the 1st May, 1853, apply to be admitted as Members by certificate of qualification, according to the terms of the Charter, shall, on production of certificates satisfactory to the Council, be registered as 'Chemists and Druggists certified to be duly qualified for admission as Members of the Society.' The register on which the names of such Chemists and Druggists shall be entered shall be closed on the day of the Annual Meeting of the said Society in the month of May, 1853, when the existing bye-laws shall cease to be in force; after which time the persons so registered shall be admitted as Members of the Society on payment of the entrance fee and the subscription for the current year." This so far undoubtedly altered the bye-laws of 1851, that whereas by those bye-laws no person

could be admitted, in respect of his having been engaged in business on his own account, unless he had been so engaged in business on his own account prior to the year 1843; by this bye-law any person who had been in business on his own account up to the time of the passing of the Act of Parliament was entitled upon certificate of his being otherwise duly qualified to be admitted a Member of the Society.

Now, under those bye-laws the Council of the Society admitted a considerable number of persons whom they believe to be in all respects duly qualified; and the object of the present enquiry is to try the validity, that is what is attempted to be done in the present form of proceeding, of the admission of those persons, and their right to be upon the register, and to be considered as Members of the Society of Pharmaceutical Chemists. It is said that this could not be done, because, in the mean time a certain Act of Parliament had been passed, namely, the Act of Parliament of 1852, to which I have already referred. Now that Act of Parliament made various provisions. It recites:—"Whereas, it is expedient for the safety of the public, that persons exercising the business or calling of Pharmaceutical Chemists in Great Britain should possess a competent practical knowledge of Pharmaceutical and general Chemistry and other branches of useful knowledge: And whereas certain persons, desirous of advancing Chemistry and Pharmacy, and of promoting an uniform system of educating those who should practise the same, formed themselves into a Society called the Pharmaceutical Society of Great Britain, which Society was on the eighteenth day of February, one thousand eight hundred and forty-three, incorporated by Royal Charter." Then it recites the provisions of the Charter as to who the Members should be, namely, Chemists and Druggists who had been established on their own account at the date of the Charter, "or who should have been examined in such manner as the Council of the said Society should deem proper, or who should have been certified to be duly qualified for admission, or who should be persons elected as Superintendents." Those are the persons I have already mentioned to you. Then it recites:—"And whereas it is expedient to prevent ignorant and incompetent persons from assuming the title of or pretending to be Pharmaceutical Chemists, or Pharmaceutists in Great Britain, or Members of the said Pharmaceutical Society, and to that end it is desirable that all persons before assuming such title should be duly examined as to their skill and knowledge by competent persons, and that a register should be kept by some legally authorized officer of all such persons: And whereas for all purposes aforesaid, and for extending the benefits which have already resulted from the said Charter of Incorporation, it is desirable that additional powers should be granted for regulating the qualifications of persons who may carry on the business of Pharmaceutical Chemists." Then it proceeds to enact that the Charter shall be confirmed except in so far as it is afterwards altered by the Act. It gives power to the Council to alter the bye-laws, provided they are approved of by a Special General Meeting of the Society and the Secretary of State, which is a very important clause, to which I beg to call attention. Then, after providing for the manner in which at meetings of the Society, the votes shall be taken, it directs the Council to appoint a Registrar; and then comes this fifth clause,—"The Registrar to be appointed under or by virtue of this Act shall from time to time make out and maintain a complete register of all persons being Members of the said Society, and also of all persons being Associates and Apprentices or Students respectively, according to the terms of the Charter of Incorporation, and shall keep a proper index of the register, and all such other registers and books as may be required by the Council of the said Society, and may be necessary for giving effect to the bye-laws of the said Society, and to the provisions of this Act."

Lord Campbell.—That is the enactment on which the mandamus is founded.

The Attorney-General.—Yes, my Lord.

Sir F. Kelly.—The 5th section.

The Attorney-General.—The 5th section is the one which directs the Registrar to make out and maintain.

Lord Campbell.—He is to obey that obligation.

The Attorney-General.—Yes, my Lord. The terms of the mandamus are that he shall make out and maintain a complete register of all persons.

Sir F. Kelly.—My friend has once or twice (it is only to correct a mere verbal inaccuracy) treated the case as if the question were whether these persons on the register were entitled to be registered as Members of the Society. That is not so;

the issue is as to their title, or rather as to the keeping of a register of Pharmaceutical Chemists.

Lord Campbell.—It is upon this 5th section the mandamus depends.

Sir F. Kelly.—No doubt, my Lord.

The Attorney-General.—Yes, my Lord. Therefore I call attention to the 5th section, which directs that the Registrar "shall from time to time make out and maintain a complete register of all persons being Members of the said Society, and also all persons being Associates and Apprentices or Students respectively, according to the terms of the Charter."

Lord Campbell.—The question turns on what they ought to do under this section.

The Attorney-General.—Just so. Then the 6th section says: "All such persons as shall at the time of the passing of this Act be Members, Associates, Apprentices, or Students of the said Pharmaceutical Society of Great Britain, according to the terms of the said Charter of Incorporation, shall be registered as Pharmaceutical Chemists, Assistants, and Apprentices or Students respectively." Then the Registrar is to certify, and his certificate is to be evidence. Then there are to be examinations, and there are provisions as to the persons to conduct them, and the power of the examiners to grant certificates. Then there is the provision that "Every such person who shall have been examined by the persons appointed as aforesaid, and shall have obtained a certificate of qualification from them, shall be entitled to be registered by the Registrar according to the provisions of this Act, upon payment of such fee or fees as shall be fixed by the bye-laws; and every such person duly registered as a Pharmaceutical Chemist shall be eligible to be elected as a Member of the said Society; and every such person duly registered as an Assistant shall be eligible for admission as an Associate of the said Society; and every such person duly registered as a Student or Apprentice to a Pharmaceutical Chemist shall be eligible for admission into the said Society, according to the bye-laws thereof." Then there is an exception made as to the Members of the medical profession, who are not to be registered; and then the 12th section provides: "From and after the passing of this Act it shall not be lawful for any person, not being duly registered as a Pharmaceutical Chemist according to the provisions of this Act, to assume or use the title of Pharmaceutical Chemist or Pharmaceutist in any part of Great Britain." Then he is liable to certain penalties if he does.

Those, I think, are the main provisions of the Act, and then upon this Act arises the question whether the Act excluded the Council from making the bye-laws which they did in 1852; and, secondly, there would be this further question, whether the Registrar has not done all that the Act calls upon him to do, and that it was his duty to do under the circumstances of the case.

Now, Gentlemen, I believe I may at once say that the facts will admit of very little difficulty. There is hardly anything in dispute between us on the question of fact and the whole matter must necessarily resolve itself into a question of law. What has been already said in the former discussions on the part of those who deny the validity of the appointment of these persons as Pharmaceutical Chemists is, that this Act of 1852 prevented the Council of the Society from altering bye-laws that they had made in 1851. It is said that the general scope and effect of this Act is to prevent after its passing anybody from being registered or assuming the character of a Pharmaceutical Chemist who was not subjected to an examination by competent persons appointed under this Act of Parliament.

Sir F. Kelly.—Except those who were Members of the Society at the time of the passing of the Act.

The Attorney-General.—Except those who were Members of the Society at the time of the passing of the Act. Now, undoubtedly, there is a provision which keeps the existing bye-laws in force, and which says that they shall be in force until the meeting of the general body of the Society in the ensuing year, 1853. We contend, on the other hand, that that did not at all derogate from this power, which is expressly reserved by this Act of Parliament, to alter, vary, and add to the existing bye-laws. That is one of the points of contention; and we say that inasmuch as these bye-laws of 1852, made after the passing of this Act, were subsequently confirmed by the general meeting of the Society, and approved of by the Secretary of State, as required by the Act, that these bye-laws were good and valid bye laws, and the Members admitted under them are entitled to be so admitted as Pharmaceutical Chemists.

Lord Campbell.—The facts not being in dispute, would not the best course be at once to make a special case of it.

The Attorney-General.—A special verdict, my Lord.

Lord Campbell.—A special case may go along with a special verdict.

The Attorney-General.—There is, however, this further question, my Lord, which is the second part of the case, whether the Registrar, to whom this mandamus is directed, has any discretion in the matter. We contend that he is purely a ministerial officer.

Sir F. Kelly.—That is upon the writ ; it has nothing to do with the special verdict.

The Attorney-General—I beg your pardon ; I admit that it is a question of law, still it is necessary that we should just show the facts, and for that purpose I propose to put the Registrar into the box to show the mode in which these persons have been appointed—the nature of the book or register he keeps ; and that, in fact, the names are those of persons admitted by the Council, not by him, he having nothing on earth to do with their admission. He receives from the Council of the Society the names of the persons whom they have thought proper, in the discretion vested in them by the Charter and Act of Parliament, to admit as Pharmaceutical Chemists. He receives the names from them and enters them in his book. It may be a matter of great importance hereafter when we come to discuss this matter as a question of law how far this gentleman is under any legal obligation to do something which, as we contend, he has no discretion or authority whatever to do.

Lord Campbell.—That is saying that the real question to be tried may not be determined by this proceeding.

The Attorney-General.—It is so undoubtedly, my Lord ; we pointed out that from the beginning.

Sir F. Kelly —It arises on the mandamus ; it will be on the record.

The Attorney-General.—The parties interested here are not the Council of the Society or the Registrar, but the parties interested are persons who have assumed the title of Pharmaceutical Chemists, and *primâ facie* being on the existing Register.

Lord Campbell.—It is a very important case, and ought to be decided in such a way as to be free from technical objections.

The Attorney-General.—We from the beginning have pointed out that there was this difficulty, and if the mandamus went in the terms my learned friend applied for, it would very likely end in disappointment. One of our points of contention is, that there is no appeal from the decision of this Society, and by the terms of their Charter, the Council have a discretion invested in them. If they have exercised the discretion improperly, they are responsible to the Society, but to no one else. At the present moment I do not propose to occupy your Lordship's time in discussing the law further, but all I propose to do, is to put the Registrar into the box, and to ascertain from him the facts and circumstances under which he keeps the register, and then the whole matter will be entirely ripe.

Sir F. Kelly.—My Lord, I entirely agree that a special verdict is the proper course to be adopted upon this occasion. Your Lordship will observe, looking at the terms of the issue, that all we have to determine here, and all that will be embraced in the special verdict, will be the question whether the Registrar has made out and maintained a register of all persons being, not Members, but being Pharmaceutical Chemists in Great Britain, according to, in conformity with, and as required by the Act. That is the whole question here, and I agree that it will be better raised, as there is no dispute at all about the facts, on a special verdict. As to any difficulty of ultimately determining on this record the question whether this is a ministerial officer, or whether in fact this is the proper mode of enforcing the performance of his duty, if he has any duties at all, I can only say, that we were very anxious, as your Lordship will remember, to raise that question in any form in which it could be raised, and to adopt for that purpose, any suggestion that might fall from the Court, or even from my learned friends on the other side. However, we were driven to this course, and I apprehend it will be found that that is not the question here to-day, but it will be found that that question also, namely, whether there is a duty imposed by the Act of Parliament upon this officer, the Registrar of this Society, will be involved in the writ of mandamus, which will also be upon the record, and if there be a special verdict, upon the special verdict this question will be determined, whether he has kept a proper register, and also the question whether the duty can be enforced by mandamus will be upon the record, and therefore the opinion of a Court of Error may be taken upon it.

Lord Campbell.—There is no obstacle to a special verdict at all.

Mr. Bramwell.—Then we will call Mr. Smith the Registrar. The objection to the register is, that there are some names alleged to be improperly upon it.

Sir F. Kelly.—In order that your Lordship may see the reason of one or two questions that I may have to put to this gentleman, I will state this: he has kept a register, no doubt, of all persons who are entitled to be registered as Pharmaceutical Chemists, but he has also introduced into the register, and registered as Pharmaceutical Chemists, a very great number of persons, some two or three are named, quite sufficient for the present purpose, who are not, as we say, entitled to be registered under the Act as Pharmaceutical Chemists. Then there is a clause of the Act of Parliament, on which in truth, the benefit to the public of the whole Act itself depends, namely, the clause, that any one paying a shilling, may ascertain whether any given individual whose name he mentions is registered as a Pharmaceutical Chemist, that is, whether he is a person in whom confidence may be placed, and of course that provision of the Act of Parliament cannot be complied with if the register contains the names of unqualified persons, who have no right to be there, as well as of the qualified persons who are duly and properly registered.

Lord Campbell.—It would not answer the purpose intended.

Sir F. Kelly.—Yes, my Lord, that is the question.

Mr. Bramwell.—I mention this because it may not be necessary to go into any evidence at all. I understand my learned friend's point to be, that there is a register within the Act, except that there are certain names upon it which he alleges ought not to be there.

Sia F. Kelly.—Yes, but we must go a little further; we should like to have from the Registrar when the book was made, and how these persons, whose names are objected to, came to be inserted.

Mr Bramwell.—Very well, we will ask him.

Mr. George Walter Smith was then called. The substance of his evidence on a lengthened examination is as follows:—Witness is the defendant in these proceedings. Is the Registrar and Secretary of the Society: produced a book marked B, which had been in his possession from the year 1843, containing a complete list of the Members of the Society, including the several classes of persons referred to in the Charter, namely, those elected, those examined, and those certified, &c. Prior to the entry of the names in the book, the parties are all approved and elected by the Council. Witness has nothing to do with the election or approbation of the persons certified or elected by the Council. The names are entered on the minutes of Council, and he transfers the names from the minute-book to the register on receipt of the fees or subscriptions. He produced a book marked F, endorsed "Register of Pharmaceutical Chemists, Assistants, and Apprentices or Students, 1853." It was commenced in November, 1853, and contained the names of all the parties entitled to be so registered for that year. Makes a fresh register every year, containing the names of all persons continuing to be Members or elected during the year, including those who have been examined. His duty as Registrar consists simply in registering the names of the parties approved and elected by the Council, on receipt of their fees, &c. Was appointed Registrar on the 4th of August, 1852. There was previously no officer holding that title. The book B contains the names of all Members elected from the date of the Charter up to the present time. Keeps the minute-books. When any person calls to pay his fee he refers to the minutes of the Council, and on finding his name there entered as elected, and being satisfied as to his identity, takes the fee and enters the name on the register. Produced a book marked C, containing the names of those who had passed the examination since the passing of the Act. His authority for entering names in that book is a certificate signed by the Chairman of the Board of Examiners. Could produce the form of certificate, but had forgotten to bring one into Court. The book marked F (entitled the Register of Pharmaceutical Chemists, &c.), contains the names of those who were Members at the time of the passing of the Act. It is entitled Register, 1853, and contains all those who were entitled to be registered for that year. He has a book for 1852, similar in form and substance, but not in title. It is entitled, "Register of the Pharmaceutical Society of Great Britain, 15 and 16 Vict., 1852—Members, Associates, and Apprentices or Students." (*Sir Fitzroy Kelly* endeavoured to elicit on cross-examination that this register was altogether distinct and different from the register marked F for 1853. *The Attorney-General* contended that the two books precisely corresponded, but the title of the latter had been altered in accordance with the terms of the Act).

Witness explained that the register of 1852 contained the names of the then Members upon whom the Act conferred the title of Pharmaceutical Chemists. The register F, being the register of Pharmaceutical Chemists for 1853, contains the names of Members elected since the passing of the Act, some of whom have not passed the examination, and who were not Members prior to the passing of the Act. It contains the names of William Murdock, John Abraham, and John Wright, whose names are not in book C (the register of those who have passed the examination). The number of Members elected on certificate without examination since the passing of the Act exceeds 600. If any person should apply to witness, paying a shilling, and inquiring whether the name of any person were on the register of Pharmaceutical Chemists, he would refer to the register for the year. In 1852 he should refer to the register of 1852, before mentioned; in 1853 to the register of 1853 (marked F); in the present year he should refer to the register of 1854.

The Attorney-General.—Those persons who were admitted without passing an examination, were they admitted under the bye-laws of the Society made in 1852?

Witness.—In virtue of a bye-law passed in 1852.

Lord Campbell.—These bye-laws were produced and put in evidence.

The Attorney-General.—Is that in dispute between us?

Sir F. Kelly.—No. I shall admit the making of any bye-laws.

The Attorney-General.—There is not the least necessity for going into all this.

Sir F. Kelly.—We will admit and put on the special verdict all bye-laws made, and their dates: if you will tell me what certificate it is I will admit it. The certificates are upon the admissions.

The Attorney-General.—Then we need not trouble ourselves with it.

Lord Campbell.—Is there any thing else?

Sir F. Kelly.—I presume my learned friend agrees with me in addition to your Lordship's notes, the admissions will form the basis of the special verdict.

The Attorney-General.—Certainly. If there is any thing accidentally omitted we should be glad to include it.

Mr. Bramwell.—We should like to know what the points are. One would have thought that a special verdict might have been stated in one minute. There is a good register, except that there are some names of persons who have not been examined. The question is whether that makes it a bad one? There is a special verdict in less than five minutes.

Sir F. Kelly.—You are wasting an additional minute in making that statement.

Mr. Bramwell.—Is my learned friend to have the exclusive privilege of wasting time?

Lord Campbell.—I shall not waste any of your time: Gentlemen, you will have to find the facts proved, leaving the law to the Court. This is what we call a special verdict.

[We extract the following from the report of the case in the *Times*.]

The jury looked at the judge, then looked at each other, until the attorney put a guinea into each man's hand, and then walked out of the box, apparently in perfect amazement that their time had been thus wasted, as the whole might have been as well settled without their attendance.

There was, however, one matter of some importance in the case which was decided—namely, the proper pronunciation of the word "pharmaceutical."

Lord Campbell said there appeared to be one vexed question which he should like to have decided, as some gentlemen pronounced the "c" in the word soft, but others treated it as hard. He would ask the Attorney-General what he said it was?

The Attorney-General said, in his opinion, it was soft. It came from the Greek; but when it became English it must be subject to the English rules; but he had been cautioned by some of his learned friends as to the mode of pronouncing it.

Sir F. Kelly said, of course, he should bow to the opinion of his learned friends, who were so much superior to him in learning as in everything else.

The Attorney General said, that was rather too bad, as Sir F. Kelly had himself cautioned him.

Sir F. Kelly said, whatever his Lordship should say it was, that would be the mode to be adopted.

Lord Campbell—Then let it be soft.* Be it so.

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* This decision of Lord Campbell confirms that at which we arrived in 1841. (See Vol. I., page 178. "PHARMASUTICAL *versus* PHARMAKUTICAL.")

TO CORRESPONDENTS.

W. W.—Calcined Mercury.—Hydrargyri oxidum rubrum of the Dublin Ph. 1826. Prepared by calcining mercury in a glass vessel with narrow mouth. It has also been called Hydrargyri oxidum per se.

"*Æsculapius.*" (Birkenhead).—Oil may be deodorized by filtration through peat charcoal.

J. G. (Bedworth).—The compound in question could not be sold unless the provisions of the Arsenic Act were complied with; namely—registration of each sale, and in the presence of a witness known to the vendor.

"*Investigator.*" (York).—(1). Medicinal Prunes are the produce of *P. domestica, var. Juliana.* Table Prunes of the *var. Catharinea.* See Pereira's *Mat. Med.*

J. R. J. (Cardigan).—*Annatto* is obtained from seeds of the Annatto plant (*Bixa Orellana*).

Justice.—Infusum Juniperi.—The berries should be bruised.

C. J. (Pimlico).—We are unable to give the formula required.

Prudentia (Liverpool) inquires "Whether a master can legally yoke his apprentice to any drudgery he may think fit; dragging a hand-cart, for instance." [This would depend upon the nature of the business, which "*Prudentia*," or his parents, would of course ascertain before signing his indentures.]

An Assistant inquires whether there is any foundation for the rumour that Sir James Graham has offered £100 a year to Chemists' Assistants to serve as Dispensers on the Fleet. We believe not.

S. R. (Clevedon).—The letter was received too late to be answered last month. We have not received the statement referred to, and should not publish any such statement unless properly authenticated.

A Member has directed our attention to the demise of the Hahnemann Hospital, late of Bloomsbury Square, which departed on Saturday, the 3rd of June.

M. P. S. (Canterbury).—(1.) The formula is not correctly quoted, for three ounces read one ounce.—(2.) The quantity should be ℥ss. not ℈ss.—(3.) We have only seen one edition of the work.

Prepared Lambskin.—This is of two kinds, impermeable and perforated. The impermeable is used in the same way as the spongio-piline, or when covered with silk as an ordinary adhesive plaster. The perforated skin is used for the application of water dressings and evaporating lotions. The mode of preparation is an invention of Dr. Scott Alison, and the skins are sold by Mr. Hamilton, 27, North Audley Street, Grosvenor Square.

C. S. A. B.—To determine the purity of ground white lead, treat a portion of it with boiling concentrated nitric acid to decompose the oil, then calcine the product until all the organic matter is removed, and dissolve the residue in dilute nitric acid. Pass sulphuretted hydrogen through the solution, and ascertain whether the precipitate consists only of lead. Ascertain whether the filtrate contains any other base, which it should not contain if the sample was pure.

S. M. (Birmingham).—*Clark's Soap test* is made by dissolving one ounce avoirdupois of good white curd soap in a gallon of proof spirit. As the strength of soap is liable to some variation, the test is tried with a standard solution made by converting sixteen grains of pure carbonate of lime into chloride of calcium, and dissolving this in one gallon of pure distilled water.

A Pharmaceutical Chemist (Denbigh).—Sulphuric ether was formerly called spirit of vitriol, or sweet spirit of vitriol, which we presume is the substance referred to.

Errata, Vol. xiii.—Page 599, line 20, *for* ratassia, *read* ratafia; line 29, *for* burnings, *read* bumpings; line 35, *for* it, *read* I; line 41, *for* did, *read* did not. Page 600, line 16, *for* air, *read* oil.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. II.—AUGUST 1st, 1854.

THE PHARMACOPŒIA COMMITTEE OF THE PHARMACEUTICAL SOCIETY.

The appointment of a Committee by the Council of the Pharmaceutical Society, to assist the Royal College of Physicians in the practical details of the Pharmacopœia, has been for some time in contemplation.

The Members of the College not being themselves engaged in the practice of Pharmacy, have been in the habit of employing an operative Chemist to perform such experiments as might be required in the course of their deliberations. The late Mr. Richard Phillips was for many years thus engaged, and the laboratory of Apothecaries' Hall has been frequently resorted to for such investigations. It has also been the custom to obtain information and receive suggestions from other sources, and circulars have sometimes been addressed by the College with this object to persons whose practical experience in Pharmacy might enable them to render assistance. About two years before the publication of the last Pharmacopœia, circulars of this description were received by several Members of the Society, and the subject having been introduced to the notice of the Council, a discussion arose as to the course which it might be advisable to take in reference to these communications. It was the unanimous opinion of the Council that the kind of assistance and information required by the College would be more likely to be obtained by means of official communications between the College and the Society, than by the mode hitherto adopted; and answers to this effect were sent by some of those who had received circulars. The College of Physicians did not, at that time, adopt the suggestion, but the question was entertained, and the desired arrangement is about to be effected. Some of the details with regard to the constitution and functions of the Pharmacopœia Committee are not yet finally decided; but the present Committee, which is only a provisional one, will be considerably enlarged, and will not be confined to London Members.

LATE HOURS OF BUSINESS.

It is an object of laudable ambition with every honest man to exercise his talents and industry to the best advantage in procuring the comforts of life, and acquiring or retaining an independence. But there is in this country, which has been called "a nation of shopkeepers," a tendency to mistake the *means* for the *end*, and to exhaust the entire energies of body and mind in the toil of commercial pursuits. As a natural consequence of excessive competition, the hours of business are extended, to the exclusion of that recreation and intellectual improvement which are required for the sanitary and mental welfare of the community. In this age of advanced education, when all classes, from the highest to the most humble, are expected to be making some progress, it is of great importance that all should have the opportunity of attending to the improvement of the mind, as well as providing for the wants of the body. This is impossible while all the time which is not actually required for eating, drinking, and sleeping, is occupied in the daily toils of business.

Some avocations afford greater facilities than others for study and recreation; it is therefore desirable in the endeavours to counteract the prevailing tendency above referred to, that the subject should be considered by each class separately,

and also by the public at large. Numerous associations have been formed for this purpose, and some improvement has been effected, but much remains to be done. The bankers, who had less cause to complain than many other classes, set the example of early closing. On a contemplation and discussion of the hardships they endured, it was demonstrated to the satisfaction of those whom it concerned, that their hours of business—from 9 A.M. to 5 P.M.—were too severe a tax on human nature! Accordingly, 4 o'clock was generally adopted as the hour for closing, and the Chemist, whose daily work is spread over sixteen hours, if he require cash for a cheque at ten minutes past four, must wait until to-morrow, because the limit of a banker's day is seven hours. The drapers, mercers, and hosiers, have introduced an improvement, and instead of keeping their shops open until 10 or 11 at night, they are gradually adopting 8 or 9 as the hour for closing. The grocers, oilmen, ironmongers, dealers in fancy goods, and some other tradesmen, have also curtailed their hours of business.

The Chemists, who are, we believe, the greatest sufferers, have hitherto had little or no redress. Their usual hours of business, seven days in the week, are from seven A.M. until eleven P.M., with the liability of being called up in the night in cases of emergency. In some towns in the country, and a few districts of the metropolis, the shops are closed earlier in the evening, and where several assistants are kept, they relieve each other by taking the duty after nine in the evening in rotation.

But including these exceptional cases in the calculation, we believe the hours of application to business exceed those which are imposed on any other class.

When it is considered that the Pharmaceutical Chemists are now required to take up a higher position in regard to qualification than was formerly thought necessary—that they must go through a course of mental training in addition to the mechanical routine of the trade, it must be admitted that a limitation of their hours of business is highly desirable, not only on account of their bodily health, but also with a view of affording opportunity for study.

In the year 1847 several meetings were held and exertions made, in the hope of introducing the desired amendment by the adoption of an earlier hour for closing the shops on week-days, and by discontinuing the practice of keeping them open on Sunday. This movement was attended with only partial success. Many Chemists closed their shops entirely on Sundays, and some have continued the practice up to the present time, while others have reverted to their former custom of keeping them partially open. Some put up their shutters rather earlier on week-days than they did formerly, but this has not been generally followed, and even where it is done it has afforded but little relief to the assistants.

In another part of this number will be found a report of a meeting held at five in the morning, and we are informed that it is intended to take other means of bringing the subject under the notice of Pharmaceutical Chemists generally.

We should be glad to promote the success of these endeavours, and with this object take the opportunity of offering a few suggestions. It must be recollected that there are three parties concerned in the question, namely, *principals*, *assistants*, and *the customers*. Principals, while they would be gainers in regard to comfort and relaxation, have a pecuniary interest at stake. Assistants have everything to gain by early closing, and nothing to lose, so long as they continue to be assistants. The customers have nothing to gain by it, and can only be influenced by an appeal to their sympathy.

The parties chiefly interested, therefore, are the assistants, and the success of their efforts will be greatly influenced by the tone and spirit in which they advocate their cause. A respectful appeal to their employers, accompanied with a plain statement of facts, is entitled to, and would receive due attention; but intemperate language, or a dictation of terms and conditions, should be studiously avoided. The parties who must ultimately decide the question are those

who are in business on their own account, and who are open to conviction but would not listen to clamour.

Although principals have a pecuniary interest at stake, they *could* lose nothing in the end by curtailing the hours of business, if all would take the same course; but this is not likely to occur, and any arrangement founded on the supposition that a pledge of this kind will be universally taken and faithfully kept, must inevitably end in disappointment. There will always be some waverers or impracticable men who take their own course, and refuse to go with the stream. It is also a mistake to lay down a general rule with regard to the hour of closing, and to make it applicable to different localities and different kinds of business. For example, in the neighbourhood of Cornhill and Lombard Street, nine o'clock would be a late hour for closing, as the pressure of business is usually over at or before eight. At the east end of Piccadilly, the Haymarket, and about Covent Garden, the thoroughfare is thronged until midnight. We have also observed that at eight o'clock most of the shops in Regent Street are closed, while in Oxford Street at the same hour, a large majority are open. Some regard must therefore be paid to the prevailing custom in the district, and in attempting to introduce a change, an appeal should be made to the inhabitants generally. There is also a distinction between different kinds of business, whether a dispensing or small retail, in a populous district, or in a more aristocratic neighbourhood; and one person cannot correctly judge of the business of another by his own with regard to the hour at which the demand ceases.

If any reform is to be introduced, it must be done by endeavouring, not to fix upon an hour to be universally adopted, but by an agreement among the parties concerned as to the principle to be observed, due regard being paid to the custom and requirements of each district. Example is better than precept, and if each individual would adhere to what he considers to be right, instead of rivalling his neighbours whenever he observes a departure from the general rule, we might hope to see a reform of the late-hour system. The man who keeps his shop open the latest may occasionally secure the last stray customer at the end of the day, but those who set the example of closing at a reasonable hour are more likely to enjoy the respect and patronage of the public, and we think they would find at the end of the year that they had lost nothing by their adherence to a principle, the propriety of which is generally acknowledged It must not be forgotten that whatever reform is introduced must be voluntary, and any attempt to carry the point by coercion or dictation would defeat its own object. We are informed that this is the principle advocated by the Association under whose auspices the meeting was held, and that it is their desire to lead, but not to drive—to convince by argument, but not to usurp authority. Although some of the speakers at the meeting used rather strong expressions, we attribute the circumstance to the excitement of the debate, and in the belief that the advocates of early closing are only endeavouring by a calm and respectful exposition of facts to obtain such amelioration of their condition as may be found practicable, we wish them success.

It is only on this ground, that we have on the present occasion, introduced a subject, the discussion of which we have hitherto rather discouraged, as being attended with much difficulty, on account of its interference with the domestic and business arrangements of individuals. At the establishment, and during the early proceedings of the Society, it was thought inexpedient to introduce questions of this nature, and we are not so sanguine as some of our friends with regard to the amount of success to be expected from the movement. It was justly observed by one of the speakers at the meeting (page 88), that its success must very much depend on the Assistants themselves, that "if employers were induced to close their shops earlier, Assistants must be stimulated to increased attention and diligence." We might add that, so long as Assistants attend to this wholesome advice, we shall be glad to advocate their cause.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

(The following was accidentally omitted last month) :—

AT A MEETING OF THE COUNCIL, *June 7th*, 1854,

BEING THE FIRST MEETING AFTER THE ANNIVERSARY.

The election for the office of President having been taken by ballot, was declared to have fallen on Mr. Henry Deane.

The election for the office of Vice-President having been taken by ballot, was declared to have fallen on Mr. John T. Davenport.

Mr. Daniel Bell Hanbury was elected Treasurer.

Mr. George Walter Smith was appointed Secretary.

The President having reported the substance of a conversation with Dr. Frederic Farre, on the best mode of procuring information on pharmaceutical subjects in connexion with the Pharmacopœia, especially the experience of Pharmaceutical Chemists, it was

Resolved, "That the President, Vice-President, Mr. Squire, and Mr. Bell be a Committee to confer with the Pharmacopœia Committee of the Royal College of Physicians on the subject of the Pharmacopœia, and report to a future meeting of the Council."

AT A MEETING OF THE COUNCIL, *July 5th*,

The President laid the following letter before the Council:—

"*College of Physicians*, *July* 3, 1854.

"Sir,—I am directed by the Pharmacopœia Committee of the Royal College of Physicians to communicate to you the following resolution passed June 19th, 1854, which has since received the sanction of the President of the College:—

"*Resolved*, 'That a deputation from the Pharmaceutical Society having, at a conference held with the Pharmacopœia Committee of the Royal College of Physicians, June 29, 1854, suggested the formation of a Committee of Members of the Society as the most efficient means of obtaining the information on pharmaceutical subjects required by the Pharmacopœia Committee, the Pharmacopœia Committee approve of this suggestion, and will address their communications to 'The Chairman of the Pharmacopœia Committee of the Pharmaceutical Society,' and will request the Chairman of this Committee to be present at the meetings of the Pharmacopœia Committee of the College of Physicians as often as they shall require his attendance or assistance.'

"I have the honour to be,

"Your obedient servant,

"*To* Henry Deane, Esq.,

"*President of the Pharmaceutical Society.*"

"Frederic J. Farre, M.D.

The subject of the above communication was referred to the Library and Museum Committee, which met on Thursday, the 20th of July.

The President reported that he had attended at the College of Physicians on the 12th of July, in answer to a summons addressed to the Chairman of the Pharmacopœia Committee of the Pharmaceutical Society.

The Library and Museum Committee, after due consideration of the subject, agreed to a report having reference to the constitution of the Pharmacopœia Committee and the future mode of proceeding, which will be submitted to the Council at the next meeting.

LIST OF MEMBERS, ASSOCIATES, AND REGISTERED APPRENTICES,

ELECTED IN JULY.

MEMBERS.

Bedford .....Cuthbert, John Mason	London .....Richards, James
Droitwich .....Green, James	Swire, George
London .....Gosden, Henry	York . .....Wilson, William

MAJOR EXAMINATIONS.

Brown, Allan M'Laren .....Brighton	D'Oyle, John.....Chelsea
Clayton, George Audley .....Shrewsbury	Lomas, Joseph Wilding .....London

MINOR EXAMINATIONS.

Bailey, Richard..... Salisbury	Parsons, Francis .....Southam
Church, Henry .....London	Watson, Walker .....Nuneaton
Gage, George .....Luton	

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH.	TOWNS.
Knight, John A.....	Mr. Arnold	Norwich
Matthews, Charles	Mr. Gostling	Diss
Saxby, Henry	Mr. Saxby	Lewes
Shepley, Samuel	Mr. Claughton.....	Chesterfield
Stanway, William H.....	Mr. Blandford	London
Twinberrow, John	Mr. Watts	London

PHYTOLOGICAL CLUB.

July 12th, 1854.

ROBERT BENTLEY, F.L.S., A.K.C., &C., PRESIDENT, IN THE CHAIR.

A LARGE and valuable collection of plants was presented by Mr. Deane from Dr. Melville, consisting of 400 specimens of *Eriocaulen septangulare*, 200 specimens of *Erica Mackaii*, and 200 specimens of *Menziesia polifolia*, for distribution amongst the Members of the Phytological Club.

The following paper from H. Bullock, Esq., F.R.C.S., of Leicester, was then read:

ON DIATOMACEÆ,
ARE THEY ANIMALS, OR ARE THEY VEGETABLES?

No part of the study of anatomy and physiology is more interesting than that of the lowest forms of animal and vegetable life, not only from their simple organization being the key-stone to the comprehension of the complex structures of the higher forms of both kingdoms, but because they themselves play a most important, highly useful, and salutary part in the sublime economy of nature. their functions equalling, if not exceeding, in perfect adaptation of means to ends, those of the higher grades; for whereas the latter, living in the medium, air, by a due proportion of animals and vegetables keep it pure, so the former also by the same means keep pure the medium, water, and thus indirectly air, that is, by preventing foul exhalations from the former: so that as Professor Quekett has remarked, the presence of animal and vegetable forms in water is to be regarded as a boon, nevertheless, I think those who have drawn attention to their presence in the water of the various companies are not to be censured, for, undoubtedly, had there not existed in those waters decomposing animal and vegetable matter, there would have been no necessity for the existence of these forms of life; nay, were the water perfectly pure, many of them, in all probability, could not exist; and that this is so, appears from what we see taking place in water collected from stagnant pools for the sake of examining the forms of life which it may contain; if we keep this water some time we find it becomes pure; but as it becomes clearer and sweeter, so do many of our animalcules disappear, until at length we have only some of the more common forms remaining—doubtless many devour each other—but still the disappearance of all cannot be so accounted for; we

are forced then to the conclusion, that they die for want of food; true it is, that many forms increase, but they probably either feed on living vegetables, or are sufficient in number only to clear away all structure as soon as it becomes dead.

Striking and beautiful as these facts and such as these are, and fascinating as is the observance of them, yet far more beautiful—far more fascinating is the power we have of reasoning on them, of bringing to bear the functions of the highest and noblest gift to man—mind, and so deducing the laws by which the whole creation is subservient to him, and without which he must speedily disappear, and in proportion as this reasoning and this observation is correct and accurate, so will be the aid we shall afford to the advancement of science.

With these preliminary remarks let me now proceed to the immediate subject of my paper—"The *Diatomaceæ;* are they animals, or are they vegetables?" Some authors have placed them in the one kingdom, some in the other; I believe them to be animals—and why?

In attempting to answer this question, as I hope satisfactorily, I do not purpose taking all the characters which have been noticed in animals and vegetables respectively, and then by giving *Diatomaceæ* the majority of those belonging to the former, place them in that kingdom, as is the mode usually adopted in arranging the boundary between the two kingdoms, but I wish to let my proposition stand or fall upon the fact or not of their possession of one property which is acknowledged by every one as peculiar to the animal kingdom; viz., the possession of perception—of a will. It is said, and truly so, that the power of moving from one place to another is not peculiar to the animal kingdom, that many spores of *Confervæ* constantly do so, but according to my observations the moves of *Confervæ* are vastly different from those of *Diatomaceæ;* they move, it is true, rapidly through the water, but meeting with an obstacle to their farther progress, they either come to a standstill, and do not move again till some external force is applied to them, or obey the laws of moving bodies in physics and recoil, making their angle of reflexion equal to their angle of incidence, and move on in the new direction which is thus given them; in fact, they seem to have no object in view, and appear mere automatons, and so clearly cannot be classed as animals. On the other hand, *Diatomaceæ*, and especially the *Naviculæ*, are seen moving steadily along, and meeting with an impediment, they either turn on one side, as if conscious of it, or push it away, or thread their way through it; they often stop without anything being in their way, and by-and-bye move slowly on again; occasionally, too, they may be seen making a rapid dart across the field of the microscope—what their moving power is, as far as I know, has not been clearly made out. It is very curious to see them sailing along and steering their course, as they do, without being able to distinguish the force by which they move, and it is evidently one which they are able to call into action and arrest at pleasure, and not as in the so-called *zoo-spores*, a physical force acting independently of any controlling power, which controlling power, or the existence of an *anima*, be it ever so indistinct, yet perceptible, as I believe it to be in *Diatomaceæ*, is, I am persuaded, and ever must be, the only reliable mark of distinction between an animal and a vegetable. Form, colour, structure, chemical composition, can avail us but little in those the lowest forms of organization, whether animal or vegetable, in which the cell is the foundation—the type, nay, even the whole. Examine the form of a single cell in each, it differs but little if at all; examine it chemically, it is almost identical, the difference we find is in the contents of cells, and this chiefly in the higher forms, but even in them composition of the basement remains the same, or nearly so; and with regard to the contents, it is not long ago that naturalists thought Chemistry had given them an indisputable character whereby to distinguish a vegetable from an animal; but that searcher out of the mysteries of histology, the microscope, has now dashed those false hopes, detected starch-granules in the brain, so that we are now without a single test that we may apply without difficulty, and are obliged to fall back on one requiring patient, accurate, and careful observation for its success, but a surer test, if fairly carried out, I believe, we shall not obtain: as to the fallacy of taking the mode of feeding as a test, I need only refer you to *Antinophrys, Sol.* After repeated observation, I cannot come to any other conclusion, on the grounds I have stated, than that *Diatomaceæ* are improperly ranked as vegetables.

An interesting discussion followed the reading of the paper, and the President then announced that the next meeting of the Club would take place on Wednesday, the 8th of November.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE PTEROCARPUS ERINACEUS, OR KINO TREE OF WEST AFRICA.

BY W. F. DANIELL, M.D., F.R.G.S.
Honorary Member of the Pharmaceutical Society.

In conformity with the routine of garrison duties pertaining to the Gambia command, I became stationed, towards the close of 1852, at Janjamberri, or Macarthy's Island, a small military outpost established about two hundred and fifty miles inland from the embouchure of the river. This small island was advantageously situated between Pisanea and Kayi (the points from which the intrepid Mungo Park commenced his first and second explorations into central Africa), and afforded a rich field for botanical and ethnological research. In former years the circumjacent localities, now denuded of their more valuable timber, were clothed by dense forests, from which considerable supplies were derived by the European traders at Bathurst, which consisted chiefly in what was termed in commercial parlance, African mahogany (*Ximenia Americana?*). With this mahogany was also felled another kind of wood, deemed of much less value in a mercantile point of view, and therefore seldom exported to England; yet, nevertheless, held in high request by the native communities for the purposes of house and boat-building, and other colonial appliances. By Europeans it was known under the name of *rosewood;* but the Mandingo, Joloff, and other aboriginal tribes, employed their own peculiar designation.

The latter of these trees on several occasions attracted my attention in consequence of its branches being entirely destitute of leaves and flowers, during the greater part of the dry season, while its greyish trunk was frequently tinged with ruby-coloured exudations, which occasionally collected in small dark friable masses, on the abraded surfaces of the bark, and within the deeper interstices. A careful examination of the botanical character of this product, led me to infer that it was the *Pterocarpus erinaceus*, Lam., or true kino tree of West Africa, which an analytical investigation of the gum to some extent confirmed, inasmuch as it was apparently endowed with those characteristic properties, by which medical authorities had previously distinguished it.

At present, the information we possess respecting the early history of this drug is so scanty, that it becomes necessary to enter into a detailed account of what has hitherto been published concerning it. Dr. Fothergill, so far back as 1757, seems to have been the first to describe the qualities of this gum kino, owing to the recommendation of a Dr. Oldfield, who termed it the true gum Senegal. He, however, remarked, that this title was somewhat objectionable, as the small quantity which had then been procured, had principally been derived from the river Gambia, and suggested, that if an appellation be bestowed on the gum in question, that of *Gummi rubrum astringens Gambiense*, would not be inappropriate. He also further observed, that the drug was purchased on board a Guinea ship at Hull, and amounted only to a few pounds in weight, which the purchaser vended to the most curious of his customers as a "rare sort of the true dragon's blood." This knowledge induced him to refer to the recent works of travellers in Western Africa; and in that of Moore, under a letter of instructions from the Governor of James's Fort to the author, who then resided at Bruko, a trading factory on the banks of the Upper Gambia, he found the following remarks: "There is a red liquor that bleeds plentifully from the bark of a tree called *Pau de Sangue* upon the incision, and in little time hardens to the consistence of gum, which is of great value, and therefore you are desired to use your utmost to procure large quantities of it."* Bruko is a small Foota-foulah town, located about two miles above Macarthy's Island, and the Pterocarpus or rosewood abundantly flourishes in its vicinage, and is the only

* *Med. Observ. and Inquiries, vol.* i., *p.* 358; *vide also Moore, as quoted in the same paper.*

production that yields any gum or wood of the hue that would merit the designation of *Pau de Sangue*. Moore, in reply, states that he sent a sample from Bruko, which proved to be gum dragon, and, moreover, writes in another letter, that the inhabitants of the district were accustomed to bring him various kinds of gum, amounting to ten or twelve pounds in weight, of this only two pounds were gum dragon, the remainder resembling gum Senegal of an inferior quality. He further observes that "gum dragon comes out of a tree called *Pau de Sangue*, which has a very rough bark; upon wounding it, it sweats out in drops like blood, which joining together and being dried by the sun, congeal into lumps. I have had some as large as pullet's eggs." There can be little doubt that the gum dragon here referred to, is the ruby-coloured exudation from the Pterocarpus, and consequently the true kino, as the above description will be discovered to be closely applicable both to the cortex and its peculiar sap.

Dr. Winterbottom, for many years physician to the colony of Sierra Leone, upon his arrival in 1796, in England, introduced into his practice a species of bark procured from the Mandingo country, which Afzelius from its aspect surmised might belong to the genus Rondeletia. From subsequent inquiries, however, it was ascertained that his views were incorrect, inasmuch as the same cortical substance, from specimens since submitted to my examination, were evidently those that pertained to the kino tree. A remarkable circumstance tending to confirm this statement is, that the Foulah title of *Bellenda*, by which it was known in Sierra Leone, was precisely the same under which the Foota-foulahs of the Gambia recognised it. Dr. Winterbottom likewise furnished a brief outline of its medicinal virtues, and the diseases in which the native practitioners resorted to its exhibition, to be noticed in a future part of this paper.

During his second expedition into Central Africa in 1805, Mungo Park found the *Pterocarpus erinaceus* growing plentifully in the neighbourhood of Pisanea, and transmitted the leaves and fruit to England, where they still exist in the botanical collection of the British Museum in a good state of preservation. The discovery, therefore, of the source of the original kino, can only be ascribed to this illustrious traveller.*

In their travels through Senegambia to Sierra Leone in 1817-19, Messrs. Gray and Dochard also met with this production, under the country name of *Kari*, the flowers and a leaf of which has been well delineated and described by Sir W. Hooker, by the appellation of *Pterocarpus Africanus*, or gum *Kari*, in the Appendix to their volume. Major Gray observed, that when incisions were made in the trunk and branches of the tree the juice flowed out, "at first of an extremely pale-red colour, and in a very liquid state; but it soon coagulates, becoming of a deep blood-red hue, and so remarkably brittle, that its collection is attended with some difficulty."

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* I am indebted to the kindness of a distinguished botanist, Mr. J. J. Bennett, of the British Museum, for the following history of this plant. He remarks, that "the tree producing the true gum kino of commerce was unknown, until a branch in leaf, together with the fruit and gum, were transmitted to Sir Joseph Banks from Kayee, on the river Gambia, in 1805, by Mungo Park, during his last fatal expedition into the interior of Africa (vide Park's *Journal*, *&c.*, Lond., 4to, 1815, *p.* lxi, and *p.* cxxiv). These specimens were immediately determined to belong to a species of *Pterocarpus*, at first presumed to be undescribed, but were subsequently referred by Mr. Brown (vide Denham's *Narrative*, append., *p.* 234, note) to the *Pterocarpus erinacea* of Lamarck (*Encyclopédie Méthodique*, *Botanique*, v., *p.* 728, and *Illustration des Genres*, *t.* 602, *f.* 4, fruit). In the same note, Mr. Brown also pointed out that *Pterocarpus Africanus or Senegalensis* of Sir W. Hooker, in the appendix to Grey and Dochard's *Travels in Western Africa*, *p.* 395, *t.* D., was founded on the same plant, and Messrs. Guillemin and Perottet have shown that the *Pterocarpus Adansonii* of Decandolle (*Prodromus* ii., *p.* 419) is in no respect distinct. These gentlemen have also (*Florœ Senegambiœ Tentamen*, i., *p.* 229, *t.* 54) given a detailed description of the tree, together with an excellent figure drawn by M. Decaisne, accompanied by some notes on the mode by which the gum is extracted, and on its pharmaceutical properties. In the Banksian herbarium at the British Museum, besides the specimens of Mungo Park, there are others of the leaves and fruit of the Mandingo '*kano*' collected by Mr. Pitman in 1850, and these are now completed by the addition of excellent specimens of the flowers."

The *Florœ Senegambiœ* of MM. Guillemin and Perottet, published in 1830-33, contains, however, the most correct outline of the *Pterocarpus erinaceus*. In their work the flowers, leaves, and other portions of the plant are truly figured, and afford an excellent representation of its botanical features. The characteristic description now appended has been taken from these authorities. I may remark, *en passant*, that the specimens of the kino tree brought from the Gambia by myself, when compared with those of Park, and the delineations of the above authors, leave but slight doubt as to their identity, and manifestly indicate that all belong to the same production.

PTEROCARPUS, Linn. Lamck., D.C.

Sepala 5 in calycem 5 dentatum concreta. Petala 5 in corollam papilionaceam disposita. Stamina 10, filimentis variè inter se connexis. Legumen indehiscens, irregulare, suborbiculatum, alà cinctum, sæpè varicosum, 1-2-spermum. Cotyledones crassiusculæ incurvæ. Radicula ad embryonis basim subinflexa.

Arbores aut arbusculæ inermes. Folia imparipinnata. Racemi axillares (*Char. ex D. C. Prodrom.* 2, *p.* 418).

PTEROCARPUS ERINACEUS.

Pterocarpus erinaceus.

P. cortice succum proprium nigrescentem exsudanti; foliolis 11—15 alternis ovato-oblongis, obtusis subemarginatisve, supernè glabris, subtùs densè et brevè tomentosis; staminibus 8—10 monadelphis aut irregulariter diadelphis; leguminibus orbiculatis membranaceis, in disco echinatulis.

Pterocarpus erinacea. *Poiret in Lamck. Dict. 5., p.* 728. *Illust., t.* 602, *f.* 4 (*fructus*).

Pt. erinaceus, D. C., *Prodrom. 2, p.* 419.

Pt. Adansonii, D. C., *l. c.*

Pt. Senegalensis, *Vahl ex Herb. Jussieu? Hook. in Gray's Travels in W. Africa, p.* 395, *t.* D.

Arbor 40—50 pedes circiter alta, ramosa; trunco nodoso, crasso; ramis divaricatis, teretibus, junioribus velutinis; ligno flavo-rubescenti; cortice griseo rimoso, succum proprium pallidè rubrum dein nigrescentem exsudanti. Folia impari pinnata; foliolis 11—15 alternis, distantibus, petiolulatis, ovato-oblongis, obtusis subemarginatisve, margine undulatis, superné glabris viribus, subtùs brevissimé et densè tomentosis pallidioribus, nervo medio prominulo nervulisque lateralibus parallelis, instructis; junioribus rufo-sericeis, adultis 2—3 poll. longis 1½ poll. latis. Stipulæ lanceolatæ cauli appressæ, villosæ, circiter 3 lin longæ cito deciduæ. Flores in ramis vetustis infrà foliorum gemmas nascentes, paniculati, flavi, bracteolulati, pedunculis teretibus rachi foliorum brevioribus, tomento brevi rufoque onustis, singulo pedicello 3 flores gerenti. Calyx campanulatus, hinc gibbosulus, densé velutinus 5-dentatus, subbilabiatus. Corolla papilionacea, flava; vexillo reflexo subrotundo, apice emarginato, margine subundulato, unguiculato, costâ nigrâ longitudinaliter notato; alis subspathulatis læviter arcuatis, longè unguiculatis, hinc auriculâ brevi obtusâ basi instructis, vexillum paulò superantibus; carinâ vexillo alisque breviore, petalis 2 alis consimilibus basi liberis dorso tantùm connatis compositâ. Stamina 8—10 monadelpha, interdùm inæqualiter diadelpha, nempé in 2 phalanges divisa, aut 1 filamento feré ad basin segregato, cæteris inæqualiter connatis; antheris ovato-oblongis, dorso affixis. Ovarium lanceolatum, apice sinuosum, villosum biovulatum stylo glabro incurvo et stigmate capitato terminatum, ovulis longitudinaliter affixis. Legumen indehiscens, stipitatum compressimum, membranaceum brevè velutinum, margine undulatum, mucrone brevi (stylo vestigio) lateraliter instructum, in disci centro inflatum, ubique setis rigidis spinescentibus, rufescentibus onustum, biloculare, interdùm abortu uniloculare; loculis monospermis, dissepimento transversali sejunctis. Semen subreniforme, compressum, fuscum, nitidum, cotyledonibus crassiusculis radiculâ brevi accumbenti.

Floret Februario et Martio; fructus maturescunt Maio et Juno. (*Flor. Senegamb., p.* 228-9, *tab.* 54.)

Although this species of Pterocarpus may be found growing more or less commonly in many districts of the Senegal, Nunez, and other streams of West Africa, and is probably indigenous to most of the inland regions through which they wander, yet the Gambia appears to be chiefly the *locale* where it most exuberantly flourishes. On the upper banks of this river, particularly where the kingdoms of Kataba and Nany border its course, and at Kayi, Lamain, Pisanea, and the adjacent countries, this production can be constantly met with, and in fact constitutes one of the ordinary forest trees. Prior to the occupation of Macarthy's Island, the site on which the town was erected was so thickly covered by this wood as to render the clearance difficult. The settlers, however, soon ascertained the value, and by their use of it in different kinds of woodenwork, for beams, firewood, and in the construction of their houses, gradually diminished its propinquity, so that in the course of a few years it became almost extirpated, and has, with a few exceptions, now disappeared from the island.

This tree varies in altitude according to the situation; in some places rarely exceeding forty feet, while in others more favourably adapted for its growth, the elevation it attains is seventy feet and upwards. The branches are spreading and somewhat tortuous, and are clothed with light green leaves, which make their appearance at the end of April or early in May. They again disappear in October and November, and are not seen during the intervening period, or until the ensuing spring. Numerous papilionaceous flowers of a light yellow tint, emitting a delicate odour, nearly resembling that of the cowslip (*Primula veris*), and diffusing a delightful fragrance throughout the surrounding atmosphere, may be observed in the months of February and March, at the period when the branches are entirely deprived of leaves, and previous to the commencement of their budding. The fruit, a small orbicular pod, is covered with bristles, and ripens in June and July. The trunk is invested with a greyish-coloured bark of various shades, which, as the tree advances towards maturity, becomes deeply corrugated, and broken into irregular longitudinal fissures, transversely intersected at intervals by others of less length but more superficial, so as to leave isolated projections or excrescences. The inner surface is smooth, of a deep red colour, with longitudinal fibres, cemented throughout their extent, and partially saturated by the gummiferous principle, which invariably issues forth wheresoever the bark has been wounded or removed from the tree. This portion of the cortical substance, when chewed, leaves a pleasant aromatic and astringent effect on the palate, that remains for a considerable time. It is, therefore, between this and the exterior layer, that the liquid kino is most plentiful.

The gum, when it naturally exudes, is in limited quantities between the crevices of the bark, and cannot be readily detected on account of the external crust being black, and unless the cortex has been purposely abraded or incised with the view of obtaining a larger amount, is likewise somewhat difficult of collection. The exudation, as it first appears, is of a pale and dirty reddish hue, more copious and of greater liquidity, if the younger branches or twigs are cut. This gradually darkens in colour in proportion as it becomes exposed to the air, and as the exsiccation is effected, assumes a ruby tint, which time deepens more and more.

In general the African kino oozes forth in very superficial layers, remarkably friable and brittle, and adheres with such tenacity to the abraded surfaces, that it is almost impossible to procure any quantity without being conjoined with a portion of the woody fibre. Hence this gum will always be found to have minute fragments of wood, more or less united with it, and this circumstance

has already been noticed by several writers who have given a description of those samples which had formerly been transmitted to England. Owing to its extreme brittleness, whensoever the larger masses are fractured, the fragments are necessarily small and pulverulent, inodorous, of an irregular angular form, those from the interior being shining, and of a deep ruby colour, ultimately acquiring a brownish shade by atmospheric exposure. Kino has a peculiar grittiness and flavour when first tasted, combined with a certain degree of aromatic sweetness, not immediately perceptible, and distinct from the rough and astringent action it subsequently exerts on the membranes of the mouth. The most propitious time for procuring this gum is in the months of March and April, from trees of moderate dimensions. These are to be selected principally, since in them the sap is more abundant, and consequently affords a larger supply than others. The means most efficient to facilitate its exudation is by a number of transverse incisions or abrasions in the bark, a few feet from the ground.

The generic title of *Pterocarpus* has been obtained from the Greek words πτερον a wing, and καρπος a fruit, in consequence of the pods being encircled by a broad wing; and that of *erinaceus*, the Latin name for the hedgehog, from the numerous bristles that protect them, and which have been supposed to bear some resemblance to those of this animal. Hence the English denomination of the hedgehog fruited Pterocarpus. The Mandingo designation for the kino tree in the Gambia is *Kāno*, that of the Woloffs *Waine*, and the Foulahs *Bellenda*. Various other appellations have been conferred upon it in different countries, the Mandingoes, in the vicinity of Sierra Leone, terming it *Bembee*, the Soosus *Bimbi*, while in several regions of Senegambia it is recognized by that of *Kari*. The origin of the term *kino* is involved in some doubt. The late Dr. Pereira remarks that he has been unable to trace its derivation, but considers that the Hindu name of *Kuenee* or *Kueni* may probably be its source.* Dr. Royle has long been of opinion that it was likewise taken from *Kuenee* or *Kini*, applied to a similar exudation from the *Butea Frondosa*.† A more reasonable probability, however, exists that it was derived from the Mandingo *Kāno* or *Keno*, under which name it was first sold to the European traders by the natives, and exported by them by this aboriginal expression, and subsequently retained as a means of distinction from other kinds of gum brought from the same localities.‡

Although previously employed by Dr. Oldfield, yet the merit of the introduction of African kino as a remedial agent into this country must be conceded to Dr. Fothergill, who exhibited it with advantage in chronic diarrhœas, fluor albus, and such diseases as proceeded from relaxation. Dr. Winterbottom seems only to have known the bark of the tree, from the fact of his obtaining a quantity from the Rio Nunez, where it had been given with great success in an epidemic dysentery prevalent amongst the inmates of the slave factories in that river. After his arrival in London he furnished Dr. Willan with samples, "who made a trial of it in agues, fevers, sore throat, and dysentery, very much to his satisfaction."§ Under the title of "African Bark" in the same volumes he has compiled an elaborate account of its properties, with a series of experiments instituted on it, which in the form of a decoction was resorted to in cases of African diarrhœa, where opiates and astringents were indicated, and that it proved sufficiently grateful to the stomach to have the desired effect. Independently of the testimony of different physicians, he also adduces several instances of intermittent and other fevers in England, wherein it afforded proof of considerable febrifuge powers from the beneficial effects that followed its administration.‖

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* *Elements of Materia Medica*, *vol.* ii., *part* 2, *p.* 1841.
† *Manual of Materia Medica*, *p.* 371.
‡ Vide Park's *Letter in Journal*, *p.* lxi.
§ *History of the Native Africans*, *vol.* ii., *p.* 46.
‖ *Op. id.*, *vol.* ii., *App.* 2, *p.* 43.

Park, in his last journal, merely alludes to the ashes of the bark of the kino tree being used as a flux for the smelting of iron, and that he was informed by the natives if he swallowed them he would certainly die.* Park, however, might have been misinformed. The Mandingoes usually have recourse to the wood of the *Fillœa Suaveolens*, Gill. et Per., for this purpose, which is thoroughly endowed with poisonous qualities; and it was perhaps to the cortical debris from this tree they alluded, as that of the *Pterocarpus* is considered innocuous.

The authors of the *Flore Senegambie* observe, with reference to this gum:—"Nous ne l'avous pas vu extraire pour les usages Pharmaceutique sur le bords de la Gambie."† Notwithstanding this statement, various medicinal preparations of the gum and bark in combination are exhibited for the cure of certain endemic maladies by the Mandingoes and Foulahs, in Yany, Bondu, and other inland regions of this division of Western Africa.

During the period I was in medical charge of the troops stationed at Macarthy s Island, I witnessed, on several occasions, the favourable effects of the powdered gum in checking the mucous diarrhœas, and other debilitated conditions of the intestinal canal, to which the inhabitants of these swampy localities are so subject. The bark, independently of its ordinary astringent properties, also exerts a powerful stimulant and tonic influence on the human frame. Observing that it occasionally constituted an ingredient in some of the medical compounds of the natives, I was induced to try it separately in a few cases of local remittent fever, complicated with relaxation of the bowels, as a gargle in salivation, and in other minor affections proceeding from a general atony or depression of the system, and with advantageous results. From these limited data I was led to conclude that this part of the kino tree might not unfrequently be found valuable in the treatment of a greater number of febrile diseases, attended with an adynamic state of the chylo-poietic viscera, common to the negro races, where quinine or other tonic remedies are inadmissible, or not readily attainable, and possibly may be the means of affording relief to those unfortunate travellers who, when destitute of medical resources, are compelled to experience all the baneful and pestilential vicissitudes of an African clime.

OBSERVATIONS ON SOME ADDITIONAL SPECIMENS OF PERUVIAN BARKS PRESENTED TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY MR. J. E. HOWARD.

Specimen No. 9, "*Silvery crown bark*" of Pereira.—This sort is interesting, because it is clearly identified‡ with the bark brought home by Mr. Berthold Seemann, as taken from the same tree from which he also obtained a botanical specimen of *Cinchona Condaminea a. vera*, Weddell. This specimen exactly corresponds with the shaded or principal figured branch in the *Plantes Equinoxiales* of Humboldt. It is consequently the true Loxa bark of Humboldt, and the *Cinchona officinalis* of Linnæus.§ It is, moreover, the *Cinchona cascarilla fina de Loxa* of Ruiz and Pavon, as shown by the bark No. 3 in the collection in the British Museum and by botanical specimens of their preserving, one of which, exactly resembling Seemann's, is in my possession, as is also a portion of the bark brought home by Seemann, which is precisely like the specimen now sent. M. Ruiz in his *Quinologia* did not distinguish this species from *C. nitida*, describing both under the head *Cascarilla officinal*, but in the *Suplemento* (p. 69) a difference is admitted to exist between the *Cinchona* of La

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* Vide *Journal*, *p.* 49. † *Id. op. ubi supra*, *p.* 230.
‡ Pereira, *Elements of Mat. Med.*, vol. ii., part ii., p. 1609, note 3.
§ See *Plantes Equinoxiales*, i., 33.

Condamine and *C. nitida*. This is, moreover, the *C. Condaminea* of De Candolle, who says, in vol. iv. of his *Prodromus* (referring to the above plate of Humboldt), "vulgò dicitur *Cascarilla fina* seu *Quinquina de Loxa* omnium præstans."

The intrinsic value of the bark does not appear to be equal to this great promise, in so far as the examination of this sample throws light upon it. I obtained from 100 parts of it,

Quinidine and uncrystallizable quinine.....0.40 } total 0.43
Cinchonine .....0.03 }

A similar sample, but slightly mixed with *Rusty crown bark*, imported in 1851, gave me, of

Quinidine .....0.57 } total 0.63
Cinchonine .....0.06 }

To explain this low produce from so celebrated a tree, it is necessary to recur to my previously expressed opinion, that this result must be ascribed to the extreme tenuity and consequent immaturity of the branches from which the bark is gathered. Some of the pieces of the present parcel are twelve inches in length, and are not thicker than a crow-quill. In these, the amount of useless periderm, and of equally inert crustaceous lichen is large in proportion. Consequently we have a bark, the medicinal powers of which cannot be greater than *one-sixth* of those of some of the other Loxa barks which I have described (the amount of cincho-tannic acid especially, is feeble in proportion), whilst the bark of the larger branches and of the trunk would be unquestionably much richer in alkaloids, and yet is all neglected and allowed to perish.

Messrs. Delondre and Bouchardat, in their interesting *Quinologie* recently published, remark (p. 29, note):—"We have said how much we regret that in relation to the fine qualities of other parts of America they contented themselves with *barking the trunk, and losing the bark of the branches*—here [in barks of Peru] it is quite the contrary, and we ask ourselves why, in the collection of this species, and of two others which follow, they do not renounce that routine which consists in choosing the thinnest branches, to the neglect of those of the trunk, which ought to be very rich, judging from the proportion of alkaloids which we find in these small quills, and which would thus be a great advantage to the governments of Peru and of Equador."

Custom has, however, now so firmly established the present wasteful plan, that it will not easily be altered for the better.

La Condamine says, "They told me at Loxa that anciently they preferred the largest barks, which were put aside with care as the most precious, now, the smallest are preferred." This preference, he was informed, was founded on analyses by English chemists of both barks. What these analyses were, it is of course impossible to say, as no record of them has been preserved; but before the discovery of the alkaloids, the researches of chemists did not throw much light on the value of the barks.

Laubert, in his *Recherches sur le Quinquina* (p. 57) says: "It is not unimportant to remark that there exists a great difference not only between the barks of different species, but also amongst those of the same tree, according as it is older or younger. In the young branches, *the astringent principle predominates*, the aromatic and resinous principle becomes more abundant in their more mature age. Old age vitiates or destroys the immediate principles, through causes which it is easy to establish. This difference between the constituent principles has much influence on the physical character of the barks."

M. Guibourt says (*Histoire des Drogues*, vol. iii., p. 102): "The age at which the *Quinquina brun de Loxa* is gathered, occasions great variation in its properties. In choosing the youngest and most slender barks, I have always found that they possessed a *more astringent and mucilaginous taste*, forming with cold water a deep yellow liquor, which precipitated gelatine very abundantly, and did not precipitate either tartar emetic or infusion of tan, whilst the larger barks, which were evidently of the same species, as appeared by the similarity

of their physical characteristics, were much *less astringent, more bitter*, and formed an infusion of a paler colour, which became strongly troubled by a solution of gelatine without forming a precipitate, and also became much disturbed by a solution of tartar emetic, and precipitated the infusion of tan."

The same author remarks, in language which would lose by translation (page 129, note):—

"Un autre écart de nos commerçants, vendeurs ou acheteurs, est d'avoir transformé *la finesse* des écorces en leur extrême jeunesse, au point que j'en ai vu s'extasier devant du quinquina si delié qú'on y distinguait à peine des traces d'organisation fibreuse."

Van Santen* found the proportion of alkaloid in this species to be in the thinnest quills as 1.42, in the strong quills as 4.444, and in selected heavy pieces as 11.104 ounces in the 100 pounds.

Specimen No. 10. *Rusty Crown Bark*, or *Huamalies Bark* of Pereira.—This is evidently the bark of the same species as the last, and appears equally with it to enter into the composition of the *Quina fina de Loxa*. It seems, however, to me to belong to De Candolle's subdivision of *Cinchona Condaminea β Chahuarguera*,† for the illustration of which he refers to the unshaded fruit-bearing branch represented in Humboldt's plate of the species. This sort, as illustrated by the specimens in the British Museum, gave the rusty coloured bark with peculiar warts of a light brown colour, which, according to Hayne, characterised the specimen of bark brought home by Humboldt. It is evidently the knotty variety of Jussieu, and the larger pieces found amongst the *Rusty Crown Bark* assimilate to the bark No. 4, which I have before described under this name.

Some of the small quills in which the rusty warts are predominant, resemble a part of the bark called *amarilla del Rey* in the collection of Pavon; and, like the bark I have described under this name, the inner surface of the *liber* presents an amygdaloid appearance. This sort (the *rusty crown*) seems, even in the smaller quills, to be tolerably rich in alkaloids. The present sample yielded per cent.

Quinine (crystallized as *sulphate*)	0.43	total 1.33
Quinidine and uncrystallizable quinine.....	0.90	

The small bundle tied up with bass by the *cascarilleros*, shows the pains which they sometimes take, and the labour thrown away in peeling minute branches. I have called this bark the *Huamalies Bark of Pereira*, in contradistinction to the *Huamalies Bark of M. Guibourt*, which I believe to be a different bark, and perhaps having its origin in *Cinchona pubescens*, as asserted by Reichel. As to the *Huamalies of Bergen*, it is, according to the specimen in the collection of the Pharmaceutical Society, again a different bark, one which is not found in English commerce, and of which I know nothing.

Specimen No. 11. This bark possesses the characteristic features of the genus *Cascarilla* of Weddell, but I cannot ascertain the species, though it greatly resembles the bark of *Cascarilla stenocarpa*, as found marked No. 1 in Pavon's collection. It recently came intermingled with the bark of *C. lanceolata*. It does not contain any alkaloid, but 3 per cent. of kinovic acid. M. Guibourt, to whom I showed this bark, remarked (by the microscope) on the inner surface of the *liber* the amygdaloid appearance which the late Dr. Pereira thought might be connected with the seat of the active principles of the bark. The existence of the same phenomenon in a bark which contains *no alkaloid* militates against this supposition.

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* Goebel's *Pharmaceut. Waarenk.*, vol. i., p. 40.

† 1. *Cinchona Condaminea*, *β Chahuarguera*, foliis ellipticis, *Cinch. Chahuarguera* Pavon. Quinol. ined. folia specim. fructif. in icon. Humb. huc pertinent. *Varietas distincta* foliis paulo latioribus et calycis lobis paulo longioribus acutioribus.—De Candolle, *Prod.*, vol. iv., p. 352.

I have a specimen of this from Bonpland's collection. It differs from the var. *α*.

ON *WAI-FA*, THE UNEXPANDED FLOWER-BUDS OF *SOPHORA JAPONICA*, L.

BY DR. TH. W. C. MARTIUS.

In the summer of 1851 I received from Hamburg a mixture, consisting of unexpanded flower-buds, together with fragments of peduncles and stalks, imported under the name *Wai-fa*. As in its external appearance it bore some resemblance to *Woad*, I supposed it might be the produce of *Reseda Chinensis*, Lour.: a more careful examination, however, proved my supposition to be groundless. The substance, which is nearly tasteless, colours water pale yellow, and in its native country is employed to dye the fine yellow silk which is used for the garments of the mandarins. In order to obtain a solution of the colouring matter, I treated three pounds of the bruised *Wai-fa* repeatedly with hot alcohol of 36° Beck. [sp. gr. ·825.] The resulting spirituous solution, concentrated by distillation, deposited upon cooling a great quantity of a greenish matter, in which was perceptible some separation of a granular, crystalline, transparent appearance. After allowing the mass to drain upon a filter, I washed the residue thoroughly with cold alcohol. The remainder when dried weighed five and a-half ounces; it was pulverulent, of a pale greenish colour, dissolved with difficulty in cold alcohol, and its solution reddened litmus.

I took the *Wai-fa* and the (as I called it) *Waifin* with me to London, but met with no one who recognised the former. In March last year I found in the *Chemisch-pharmaceutisches Central-blatt* (1853, p. 192) a communication from Professor Stein, of Dresden, to the effect that he had separated from the "*Chinese Yellow-berries*"* [*Chinesische Gelbbeere*], a peculiar colouring matter, which had proved identical with rutic acid. From the specimens of the substance he had analyzed, which he kindly sent me, I immediately recognized it to be *Wai-fa*. Some examples of the flowers in question likewise showed plainly that the plant belonged to the family *Papilionaceæ*.

Recently I have received from my friend Mr. Hanbury the following communication relative to the *Wai-fa*:—

"When Dr. Theodor Martius was in London, in the year 1851, he presented to the Pharmaceutical Society, as well as to myself and some other of his friends, specimens of a drug known in China as *Wai-fa*, and imported from Canton, where it is used as a dye. This substance consists of a mixture of dried flower-buds, with about an equal proportion of little stalks and sticks. The buds are mostly very young, one-eighth to one-fourth of an inch long, oval, and pointed at the peduncular extremity; they are of a dark greyish-green, and almost devoid of taste. They impart to water a fine yellow colour. Upon an examination of some of the more developed buds, previously macerated in boiling water, I found their structure to be that of a papilionaceous flower, and I then endeavoured to ascertain to what plant they should be referred.

"Although the Abbé Grosier† relates that Acacia-flowers are employed by the Chinese as a dye, and Sir George Staunton‡ speaks of a small species of *Colutea*, whose buds and tender leaves are used in China for colouring green, I could obtain no precise information until I applied to my friend, William Lockhart, Esq., of Shanghae, who, from his long residence in China, and intimate acquaintance with its language, was well qualified to render assistance in such a matter. From him I have at length obtained complete specimens of the plant affording the *Wai-fa*, as well as some of the substance itself.

"The plant in question, which, in the Shanghae dialect, is called *Wai-hwa*, is proved by the dried specimens to be *Sophora Japonica* of Linnæus. Although under the name 槐花樹 *Wai-hwa-shu* (*i.e.* *Wai*-flower-tree), it is of frequent occurrence in the gardens of Shanghae, the buds are not collected there for use.

"It is said, however, to be cultivated in the province of Fukhien and in the northerly provinces of Honan and Shantung, whence the dried flower-buds packed

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* Under this name I have also received *Wonshy*, the fruit of *Gardenia florida*, or of a nearly allied species.

† *General Description of China, translated from the French of the Abbé Grosier*, Lond. 1788. 8vo. Vol. ii., p. 462.

‡ *Authentic Account of an Embassy from the King of Great Britain to the Emperor of China*. Lond. 1797. 4to. Vol. ii., p. 169.

in great sacks are exported to other parts of the empire. In this condition the *Wai-fa* is kept for years, and is even preferred when old. It is employed for dyeing blue cloth green.

"In Europe, *Sophora Japonica* has been noticed to possess purgative properties. M. Fleurot, of Dijon, in 1834, made a chemical examination of it,* from which he concluded that the active principle is an uncrystallizable substance analogous to the *Cathartine* of senna leaves. The same Chemist has remarked that the dust of the wood of *Sophora*, inhaled by turners, is found to have a purgative effect, and he relates a curious instance of a similar action from its leaves and flowers. In the Botanical Garden at Dijon is a well beneath a fine *Sophora*. When its leaves or flowers are about to fall the gardener carefully covers the well, having found by experience that the water acquires laxative properties through the *Sophora* being infused in it."

As rutic acid can be prepared readily and at a cheap rate from *Wai-fa*, it would be easy to institute some experiments as to its therapeutical properties. In any case it were especially interesting to ascertain what relation rutic acid has to cathartine. I should, however, premise, that *Wai-fa* is employed remedially in China, since in a collection of Chinese Materia Medica I have received it under the name *Lundson*, with the information that it is used "for cooling!"

I may yet add that during my investigation I have received, through the kindness of Mr. Hanbury, dried specimens of *Sophora Japonica* both from China and from the Gardens at Kew, together with undeveloped flowers and perfect fruits, so that the origin of the *Wai-fa* from this plant does not admit of doubt. The only difference apparent was, that the flowers from Kew were not so luxuriant and full; when macerated in water they imparted to it a yellow less intense than that from the Chinese *Wai-fa*.

Giobert's notice, *Sulla Sofora Giappone e sua qualitata tintoria*, contained in the *Mémoires de la Société d'Agriculture de Turin*, vol. ii., 1826, I have had no opportunity of consulting.—*Neues Jahrbuch für Pharmacie*, April, 1854.

NEW VARIETY OF BALSAM OF COPAIBA.

BY MR. CHARLES LOWE,
Assistant in the Royal Institution Laboratory, Manchester.

An organic fluid was lately placed in my hands by Mr. Crace Calvert for examination, which he had received from an oil merchant of this city, who stated that all he knew of the substance was, that it was obtained by the incision of a certain tree growing on the coast of *India*. From the characters it presents I have ascertained it to be a balsam of copaiba, but as it differs in some of its properties from other balsams that I have examined, I forward you the following notice, in hopes that it may prove interesting to some of your numerous readers.

In appearance this balsam of copaiba is dark coloured and turbid. Its turbidity is due to a greenish resinous matter, held in suspension, which is, however, easily separable, either by filtration or deposition, leaving a brown transparent liquid of sp. gr. 0.970. When the latter fluid is submitted to a careful distillation it yields:—

Essential oil	65 per cent.
Resin	34 "
Acetic acid and water...	1 "
	100

I find that the essential oil in its various reactions with potassium, iodine, nitric acid, &c., and moreover in taste, exactly corresponds with those presented by pure essence of copaiba. The resin left by distillation of the balsam, either with or without water, is, if deprived of the whole of the essential oil, extremely hard. Its entire solubility in coal naphtha proves the absence of any of the soft resin which exists in most of the copaiba of commerce. This hard resin

* *Journ. de Pharm.*, t. xix., pp. 510, 657.

(copaivic acid) being most probably the active principle of balsam of copaiba, I am induced to think its quantity and purity in the one I have examined is indicative of its superior value as a medicament. The dark colour of the balsam may perhaps limit its employment, but the large quantity of copaivic acid it contains renders it valuable, as the latter may be made available by heating the filtered balsam to the boiling point with a small quantity of caustic potash or soda lye, of sp. gr. 1.34, and separating the resinate of potash or soda from the essential oil. The alkaline resinate may then be dissolved in water, giving a colourless solution (similar to Frank's specific), or the balsam may be treated with magnesia to form the ordinary copaiba pill.

I have in conclusion remarked:—

1st, That the essential oil obtained by the distillation of balsam of copaiba has, like several other hydrocarbons, the property of dissolving indigo.

2ndly, The new variety of balsam above described presents the curious property of becoming gelatinous (so much so that the tube may safely be inverted), if heated to 230° Fah., even if a *sealed* tube be employed. This character being dissimilar to the one given in the same circumstances with such other balsams as I had at my disposal, I am induced to attribute it to the large amount of "*hard* resin" it contains.

3rdly, Balsams of copaiba in general give, on distillation with two per cent. sulphuric acid, a beautiful blue volatile oil. Chlorine, hypochlorite of lime, and bichromate of potash, give a similar character with the balsam, which appears to me to be due to the oxidation of the hard resin, as I have been unable to obtain but a small proportion of the blue-coloured oil when I employed a balsam containing "*soft* resin," comparatively to when I made use of the one above described, which, as I have already remarked, contains only "hard resin." A further support of this view is, that pure essence of copaiba assumes no blue colouration when distilled as above.

4thly, That cold sulphuric acid produces a purple colouration with balsam of copaiba, similar to that obtained by its action on cod-liver oil. Such being the case, it is probable that a small quantity of it, mixed with olive or some other oil, may be sold by unprincipled persons as genuine cod-liver oil.

USE OF MUSHROOMS IN RUSSIA.

BY W. HAMILTON, M.B.

I HAVE been recently reading an interesting account of Russia, in two foolscap volumes, by Robert Bremner, published by Henry Colburn in 1840, at page 208 of which I was not a little struck by the following statement, namely:—"That the very kinds (of *Fungi*) which are poisonous with us, are here (in Russia) used every day without the least danger;" and he specifies as an instance the *Agaricus muscarius*.

He says at page 207:—"The only dish we should really envy the Russians for is their mushrooms. In England mushrooms are used by very few; in Russia the use of them is universal, from the Emperor to the beggar; and those who know what a delicate dish they make, the salted ones excepted, need not be told that they are always welcome, whether dressed with a rich sauce, as at the tables of St. Petersburg, or with the plainer one of a hut by the way-side. Many of the peasants live almost entirely upon them at some seasons of the year. In the summer afternoons bands of village children may be seen searching for them in the woods, with little baskets on their arms; and in the mornings, at some places south of Moscow, we met long files of women returning from the forests, with the hasty growth of the night heaped in large black baskets on their shoulders, like a string of fishwomen of the Moray Frith, trudging to market with odorous 'creels.' We did not hear the value of those sold in one

year at St. Petersburg, but we were told that in Moscow, not fewer than 200,000 roubles' worth (£8000) are brought to market every summer. They are most abundant in the districts where open forests occur, and are always more plentiful under certain kinds of trees; (?) far south they disappear altogether. The best weather for them is sunshine, intermixed with showers by day and warm overnight.....'These are the mushrooms of your English woods,' said a gentleman with whom we first saw them; 'why don't you eat them at home?' The information was far from tranquillizing; few would like to be told that they had made the best part of their dinner on poison; but, as *no evil consequences* followed, we doubted whether they could really be the same. Further inquiry, however, convinced us beyond all doubt that, be the cause what it may, mushrooms which are highly poisonous in Great Britain, are perfectly innocent in Russia. This is no new discovery; our men of science are already aware of the fact, but none of them have been able to explain it. With us only three kinds are eatable—the common mushroom (*Agaricus campestris*), the Fairy Ring (*A. pratensis*), and the *Agaricus Georgii*. In Russia nearly ten times that number are used; in fact, almost every kind. A French cook told us that he himself knew at least *twenty* varieties (species?), *all fit for the table*, and that an accident from them *here* [in Russia] *is totally unknown;* he considered such a thing quite impossible. The only precaution necessary, he said, is not to boil two distinct species together; but this is merely from the degree of boiling which suits one not being sufficient for the other.

"That mushrooms," he continues, "virulently poisonous in one country, are eaten with safety in another, is well known in other cases; as, for instance, in that of the fly mushroom (*Agaricus muscarius*), which is very common in England, and *always poisonous there*, while in Kamschatcha it is used as a frequent article of food. In France and Italy also some of our noxious mushrooms become quite safe. Now, what can be the cause of this remarkable diversity? Surely the question merits more attention than has yet been bestowed on it. It is not enough to say that difference of soil and climate explain the mystery; for though we know that *culture* changes the properties of plants, converting what is poisonous in its wild state into a wholesome esculent when raised in the garden —as in the case of the common celery, for example—yet, throughout the whole of the vegetable kingdom, we find almost no other instance of a plant which is *poisonous in one country* becoming wholesome, *without culture*, when transplanted to another and left entirely to itself, and in both placed in apparently the same circumstances as to soil, exposure, &c. After all, a great part of the secret may lie, not in the plant, but in the mode of preparing it for the table; and it is to this point that some of our practical authorities ought to direct their attention. So far as we can judge, the Russian cook, on first cutting up these spoils of the forest, makes a much more copious use of salt than is done with us; and the efficacy of this agent in deadening the poisonous quality is sufficiently proved by the melancholy case recorded in the medical treatises of a French officer and his wife, both of whom died in thirty-two hours after eating certain mushrooms, while the person who supplied them, and his whole family, made a hearty and wholesome meal from the same gathering."

In this case it appears, that while the former took them without addition, the latter first salted them strongly, and then squeezed them well before using them. The whole question, like that of the yellow-bellied sprat in the West Indies, is involved in much mystery; but it is well worth clearing up, since it may be the means of adding much to the resources of the poor, and increasing the amount and variety of food produced by our country. Mushrooms are highly azotized. What is the difference in the composition of the edible and the inedible fungi, and cannot the deleterious principle be got rid of as in the case of the farina of the Janipha, the Bitter Cassava, by the expression of the aqueous constituent in which it is dissolved, and the judicious application of heat?

SUBSTITUTES FOR CITRIC AND TARTARIC ACIDS AND THEIR SALTS IN DYEING.

The great increase in the price of these acids and their salts, has led to the introduction of various substitutes, especially in dyeing and calico-printing, the two industrial arts in which these acids and their salts are most extensively employed.

Gatty and Kopp's process.—This process consists in the use of lactic acid and its neutral and acid salts, as substitutes for tartaric, citric, and other acids, and their neutral and acid salts.

When lactic acid is used as a resist, it is thickened with starch or other thickening substance, and then printed by block or roller upon cloth, which is afterwards printed or padded with mordants, as is well understood by calico-printers. In lieu of one gallon of lemon-juice at 50° Twaddle, one gallon of lactic acid at about 40° Tw. is used. For the preparation of certain resists, the lemon-juice is previously saturated with an alkali; in such cases, the lactic acid is saturated and used in the same manner as the saturated lemon-juice is used.

When lactic acid is used as a discharge, it is thickened as in the above case, and printed upon cloth impregnated with mordants, which it discharges by forming soluble salts with the oxides constituting the mordants.

In using lactic acid to precipitate the colouring matter of safflower from its alkaline solution, the alkali is saturated by the lactic acid in the same manner as when citric or tartaric acids are used. In lieu of three pounds of tartaric acid, four pounds of lactic acid at about 40° Tw. are required.

In dyeing certain colours (such as Prussian blue, scarlet, crimson, and some others) on silk or wool, tartaric acid or cream of tartar is generally used. In such cases, the lactic acid or the bilactate of soda or potash is applied, and the different operations are performed in the same manner as when tartaric acid or cream of tartar is used; in lieu of every pound of cream of tartar, about $1\frac{1}{4}$ lb of bilactate of soda or potash at about 66° Tw. is used.

When lactic acid is employed for steam colours, it is substituted for tartaric acid in the proportion already stated, the preparation of the colours being the same as when tartaric acid is used, which is well understood by calico-printers.

In applying lactic acid in the preparation of white and coloured discharges upon Turkey-red and other colours, the operation is conducted exactly in the same manner as when tartaric acid is used; only that after printing, the cloth should not be exposed to a long-continued heat, which, owing to a slight volatilization of the lactic acid, would reduce its discharging properties.

Bellford's processes.—These processes are represented as founded upon the great similarity of composition which exists between the tartaric and oxalic acids, the former differing from the latter only by containing less oxygen and more hydrogen, since it is well known that 100 parts of oxalic acid are made up of 70,689 parts of oxygen, 26,566 parts of carbon, and 2,745 parts of hydrogen, whilst 100 parts of tartaric acid are made up of 69,321 parts of oxygen, 22,450 parts of carbon, and 6,629 of hydrogen. Further, upon taking into consideration the fact that sugar contains the exact quantity of hydrogen which is deficient in oxalic acid, it will be easy to see the possibility of forming an artificial tartaric acid having the same composition as that which is made from bitartrate of potash.

These are the general principles of the invention, and the way of carrying the same into effect is by following either of the undermentioned processes; viz.—Firstly, take a quantity of sugar, treacle, molasses, or any other substitute capable of forming oxalic acid with nitric acid; on this sugar or other substance pour a certain quantity of nitric acid, also some mother or residuary water in which oxalic acid has been crystallized. As soon as the nitrous vapours cease to be evolved, add another quantity of nitric acid; then reduce the solution until by cooling a crystalline mass is obtained. This mass consists of very slender needle-shaped crystals, and is next washed for obtaining the tartaric acid. After washing the crystals, add sugar which has been dissolved in some of the washing-liquor, the quantity of sugar required being proportional to the degree of acidity which it is desired to obtain. The syrupy or treacle-like fluid thus obtained is concentrated by a gentle heat, so as to prevent its getting too dark, and is then left to crystallize at a moderate temperature.

The second process consists in taking one part by weight of sugar, molasses,

treacle, or any other substance from which oxalic acid can be made by means of nitric acid, and adding to this quantity, first, about one-third part by weight of acetic acid, and then three parts by weight of nitric acid, 36° Twaddle; this produces an oxalic acid containing more hydrogen than the ordinary oxalic acid. The solution having been crystallized, the crystals are washed, dissolved, and crystallized again. In order to change this oxalic acid into tartaric acid, it is only necessary to disoxygenate it either by means of sugar or any other substance which has an affinity for oxygen. Those kinds of sugar are preferable which are apt to crystallize into candy. Dissolve this sugar in the washing-liquor and also the oxalic acid obtained as before. The two solutions thus obtained are mixed and concentrated at a low heat, and crystals of so called, "tartaric acid" are obtained by crystallizing the mixture at a moderate temperature. The tartaric acid, obtained by either of the two processes before described, may be used for producing any tartrates—such as potash, soda, &c. &c.

The washing-liquors, resulting from these processes, having been sufficiently concentrated, may also be used as a dyeing mordant for any colour.

Murdock's process.—Substitute for cream of tartar, and for the compound of cream of tartar and alum, which are ordinarily used as mordants in dyeing. The substitute for cream of tartar is composed of muriate of soda, or muriate of potash combined with nitric acid; and instead of alum sulphate of alumina is used. The mode of preparing the ingredients is as follows:—100 pounds of sea-salt are mixed with 300 pounds of water, and when the salt is dissolved twenty pounds of nitric acid are introduced.

If the mordant is required to be analogous to the compound of cream of tartar and alum, 100 pounds of sulphate of alumina are to be gradually added to the mixture: the water should be cold, and the mixture but slightly stirred, especially whilst the sulphate of alumina is being added, in order to avoid as much as possible the disengagement of nitric and muriatic acid gas, which would injure the quality of the mordant.

The new mordant is used in the dye-bath, in the same manner as cream of tartar, or cream of tartar and alum.

We have described these processes as they have been given by their authors, but cannot vouch for their efficacy. The chemistry involved in them requires no comment.

ON THE USES TO WHICH TURF MIGHT BE APPLIED IN IRELAND.

In no part of Europe, of the same extent, could we perhaps find so large an area of country covered with peat bogs as in Ireland. And further, these bogs are amongst the deepest, and the turf which they yield probably the best that is found anywhere. Yet how little have we availed ourselves of this immense wealth of fuel! With the exception of its use for domestic purposes, and in a very few factories, no successful effort has yet been made in Ireland to make turf the basis of any extensive manufacture, save the attempt now being made to obtain a number of substances from the products of its distillation, such as paraffine, wood spirit, &c. If that project succeeds it will undoubtedly grow into a great branch of industry, but it would be premature to say anything further of it here, as we purpose devoting a good deal of space to that subject in an early number.

It is when we look to other countries that we are able to discover our own shortcomings. Whilst we follow the rude and unsystematic mode of turf-cutting practised from time immemorial, and produce a fuel far dearer than coal imported from England and Scotland, we can see, not only an immense manufacture of bricks carried on in Holland with turf, and alum works, breweries, bakeries, and many other factories, both in France and Germany, using no other fuel, but even a considerable manufacture of wrought iron, arms, and general hardware carried on with it. But it is not alone by these countries, in which turf has long since been employed as a fuel, that we are outstripped. Three or four years ago no one used turf in Sweden, and many perhaps did not believe that it could be employed. Wood has, however, been growing scarcer and dearer every year in Sweden, and at length people bethought themselves of turf, and accordingly the government sent persons to the countries where turf is used, to collect information respecting the best manner of

using it; and so well have they taken advantage of the knowledge thus gathered together, that already they have left us far behind. Why should this be so? Surely it is we who, having the more bogs, ought to lead the way in all improvements connected with the utilization of peat, and convert, what are now merely centres of disease and demoralization, and refrigerators of the surrounding country, into sources of employment and wealth.

A great deal might really be done with our peat bogs if attention was concentrated for some time upon them. Scarcely a month passes without some project being formed connected with the utilization of peat; we have in fact merely to select, all trouble of invention is saved us. The stock of projects already on hand is so large and so varied, that it would be very much better to endeavour to carry a few of them out, rather than attempt to add to their number. Many of them are no doubt worthless, but many may also prove of considerable value, either directly or as suggestive of further improvements. There is, for example, the idea of making paper from turf, which we have more than once alluded to in this Journal, and which it appears is now being successfully carried out in more than one place on the Continent.

The energy and perseverance displayed by some of our manufacturers in developing the process of making straw paper, and the perfect success which has attended their efforts, is a sufficient guarantee that if some of them could be induced to turn their attention to that of making turf paper, our turf bogs, from being fringed with misery and starvation, would soon be surrounded by the fruits of industry. In the hope that some one may seize upon the idea and embody it in a factory, we shall mention what degree of success has attended similar attempts made elsewhere.

Turf bogs of a considerable extent and thickness, and very generally of ligneous character, are found in many parts of Piedmont. This peculiar quality of the turf appears to have first suggested its use as a material for paper-making, and accordingly a number of trials were instituted at Turin, which appear to have been remarkably successful. From these experiments we learn that certain kinds of turf may enter into the composition of paper, to the extent of from eighty to ninety per cent., and into that of millboard even to ninety-five per cent. The other materials employed in addition to the turf were indiscriminately old ropes or bagging, and the bark of the mulberry. The economy of using turf instead of the materials now employed is stated to be fully fifty per cent.*

In Germany also, successful experiments have been made within the last few months of the same kind. Mr. Keller, of Kühnheide, in the Saxon Erzgebirge,† has manufactured some excellent paper of low qualities from fibrous or flow peat, which possessed considerable strength, and had a sort of fatty feel, which appears to render them particularly well adapted to form packing paper for certain goods. Even so far back as 1838, Mr. L. Piette, in a small book which he published at Cologne, upon the different indigenous substances from which paper might be made, showed that a good common paper might be produced from the upper layer of fibrous turf. From his statements it would appear that 100lbs. of turf would only yield 25lbs. of paper, but this proportion would no doubt vary very considerably. But even assuming that dry turf only produced one-fourth of its weight of paper, it would still be the cheapest material that could be employed. On the edge of a large bog turf it can be readily had in large quantities for 2*s.* 6*d.* per ton; so that the raw material of one ton of paper, exclusive of a little scutching waste or other strong fibre to give strength, could be had for 10*s.*

The process of manufacture of the turf paper resembles in many respects that now followed for making straw paper. The peat is first thoroughly washed, to separate all the earthy matter from the fibrous portion; the latter is then put into a strong caustic lye, where it is allowed to soak for twenty-four hours. It is then removed and placed for about four hours in a bath of weak hydrochloric acid, and kept constantly agitated; then washed in water, and placed in a weak solution of alum. After steeping for a short time in this solution, the liquid is run off, and the mass bleached by means of chlorine, and mixed with from five to ten per cent. of rag-half-stuff and worked up in the engine, and made into paper in the ordinary way. This

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* *Annales du Commerce Exterieur*, Jan. 1854. (Official Publication of the French Minister of Agriculture, Commerce, and Public works.)

† *Polytechnische Centralhalle*, 1854, p. 46.

is the process of M. J. Lallemand, of Besançon in France, where it has been patented. It is evident that the fresh peat, as cut in the bog, would answer for making paper according to this process, which of course would save the expense of drying, stacking, &c.

As a material for making all kinds of *papier maché* and *carton pierre*, turf paper, from the low price at which it could be produced, would be invaluable. *Papier maché* has already been applied to a thousand uses, but it is still far from having received one-tenth of the development of which it is capable, and which no doubt it will receive if paper could be produced at a much lower price than it is now, and if the present impolitic and oppressive duty were removed.—*Journal of Industrial Progress, Dublin.*

MANUFACTURE OF SULPHATE OF MAGNESIA

In the time of William and Mary the saline spring at Epsom, in Surrey, furnished the sulphate of magnesia used in medicine. At present the sources whence we obtain Epsom salt are—(1.) The bittern of the sea-salt works. (2.) The "rough Epsoms," or mixed sulphates of magnesia and iron, of the alum manufacturer. (3.) Native carbonate of magnesia. (4.) Magnesian schist. (5.) Dolomite, or magnesian limestone.

Manufacture of Sulphate of Magnesia from Bittern.—At Lymington, in Hampshire, the sea-water is concentrated by spontaneous evaporation, during the summer months, to about one-sixth of its bulk, after which it is run into boilers and evaporated to the degree desired. The salt is not *fished* (as it is termed) out of the boilers and drained in baskets, but the water is nearly all evaporated, and the whole mass of salt taken out at once, every eight hours, and removed into troughs with holes in the bottom. Through these it drains into pits, made under ground, which receive the mother-liquor called *bittern*, or *bittern-liquor*. Under the troughs, and in a line with the holes are fixed upright stakes, on which a portion of salt that would otherwise have escaped, crystallizes, and forms in the course of ten or twelve days, on each stake, a mass of sixty or eighty pounds. These lumps are called *salt-cats*. They bear the proportion to the common salt made from the same brine of one to one hundred.

From the mother-brine or bittern-liquor which has drained into the pits, the sulphate of magnesia is made during the winter season, when the manufacture of salt is suspended in consequence of the want of the temperature required for the spontaneous evaporation of sea-water. The process is a very simple one. The bittern-liquor from the pits is boiled for some hours in the pans which are used in summer to prepare common salt, and the impurities which rise to the surface are removed by skimming. During the evaporation a portion of common salt separates; this, as it is too impure for use, is reserved for the purpose of concentrating the brine in summer. The evaporated liquor is then removed into wooden coolers, eight feet long, by five feet wide, and one foot deep. In these it remains for twenty-four hours, during which time, if the weather prove clear and cold, the sulphate of magnesia crystallizes at the bottom of the coolers in quantity about equal to one-eighth of the boiled liquor. The uncrystallizable fluid is then let off through plug-holes at the bottom of the coolers, and the Epsom salt, after being drained in baskets, is deposited in the stove-house to dry. These are termed *single Epsoms*, which after being dissolved in water and re-crystallized acquire the name of *double Epsoms*. Four or five tons of sulphate of magnesia are produced from a quantity of brine, which has yielded 100 tons of common and one ton of cat-salt.

No sulphuric acid is employed in the process at Lymington; but if this acid be added to the residue-liquor, a further quantity of sulphate may be obtained by the decomposition of the chloride of magnesium.

Manufacture of Sulphate of Magnesia from the "rough Epsoms" of the Alum Manufacturer.—Some years ago, when the price of alum ranged from £16 to £18 per ton, the manufacturers of alum did not take the trouble to collect the rough Epsoms contained in the mother-liquors. The price of alum, however, having been very considerably reduced, it became necessary to adopt every means in the manufacturer's power for compensating for the fall in price of their staple article. Hence the rough Epsoms have of late years been collected and become one of the sources of purified sulphate of magnesia.

Dr. Richardson, of Newcastle-on-Tyne, has devoted much time and attention to these rough Epsoms, and patented Jan. 26, 1850, the following process for obtaining pure sulphate of magnesia from them :—He directs a cream of magnesia, formed of magnesia and water, to be added to a solution of rough Epsoms, the mixture to be stirred at each addition, and steam heat applied to the mixture : as soon as the liquid filtered off from the precipitate thus formed does not undergo change on the addition of sulphuret of ammonium, it is known that enough magnesia has been added. The solution thus obtained is allowed to stand for a short time, and when clear, is run off, evaporated to the proper strength, and crystallized. The precipitate is then washed with water to remove the whole of the soluble sulphate of magnesia. By this means Dr. Richardson states that he is enabled to obtain a larger product of pure Epsom salt, by a more economical process than any previously employed. Baryta, strontia, and lime, may be employed in the same manner as the cream of magnesia above mentioned ; but as these substances combine with the sulphuric acid in the solution, and form insoluble compounds, the use of magnesia is preferred. A solution of sulphuret of potassium, sodium, ammonium, barium, strontium, calcium, or magnesium may also be used for precipitating the impurities contained in the rough Epsoms ; in which case the mixture is to be well agitated on each addition of these solutions, heat applied, and the filtered solution tested as before-mentioned to ascertain if a sufficient quantity of sulphuret has been added ; and, lastly, the solution of sulphate of magnesia obtained is to be evaporated and crystallized in the usual way. Instead of acting on the rough Epsoms by means of the precipitating agent in a state of solution, the two substances may be ground together when in a moist state, and the pure sulphate of magnesia washed out of the resulting mass.

Dr. Richardson finds the composition of the rough Epsoms to be as follows :—

Sulphuric acid	32.26
Magnesia	15.35
Protoxide of iron	1.73
Oxides of Nickel and Cobalt	0.12
Lime	0.09
Alumina	1.33
Potash	0.83
Water	48.29
	100.00

Another mode of obtaining pure sulphate of magnesia from rough Epsoms is by what may be termed the "dry way." "For this purpose," says Dr. Richardson, " the rough Epsoms are mixed with well-washed magnesian lime, in such proportions that all the sulphuric acid, except that in combination with the potash and magnesia, is taken up by the free magnesia and lime. The mixture is then calcined in an ordinary reverberatory furnace at a dull red heat, which assists the transfer of the sulphuric acid and raises the metals to a higher degree of oxidation, thereby ensuring their insolubility. The calcined product is afterwards thrown into a large circular cistern filled with water, in which a pair of edge-stones is made to revolve by suitable machinery. By this arrangement the large pieces are ground to powder, while the agitation produced by the motion of the edge-stones facilitates the solution of the sulphate of magnesia. The sulphate of magnesia liquor is subsequently clarified and crystallized in the usual shallow pans. When the liquor has drained from the crystals they are removed to a stove and dried at a low temperature. In this dry state they are thrown into a species of ternse which reduces still further the size of the crystals, and renders the whole of a more uniform appearance."

In a subsequent patent, Dr. Richardson claims the use of magnesia and carbonate of magnesia, obtained by dissolving out the lime from magnesian limestone and magnesian lime by means of the waste muriatic acid of the alkali works in the manufacture of sulphate of magnesia. (1.) In order to increase the production of rough Epsoms he proposes to use magnesia obtained as above mentioned instead of the magnesian limestone ordinarily employed. (2.) In order to produce sulphate of magnesia when manufacturing alum, Dr. Richardson adds to the alum-liquors (which always contain an excess of acid) a sufficient quantity of magnesia obtained as aforesaid, to nearly saturate the excess of acid. He then proceeds to manufacture alum in the usual way, and obtains the sulphate of magnesia by subsequently evaporating the residual liquors. (3.) He proposes to

use this magnesia in purifying rough Epsoms. In this case he adds a small quantity of vegetable or animal charcoal, in order to prevent the formation of ferric or manganic acids. In other respects the process is the same as usual. (4.) Another application of this magnesia is to the purification of rough Epsoms by calcination, in place of the washed magnesian limestone usually employed. (5.) A further use of this magnesia consists in the production of sulphate of magnesia from sulphate of iron or copperas-waters. The iron is precipitated from such solutions by the addition of magnesia obtained as aforesaid, in the state of oxide, and the sulphate of magnesia by evaporating the remaining liquors. A small quantity of charcoal is also added in this process.

Two patents have recently been taken out for manufacturing sulphate of magnesia in conjunction with Venetian red. Dr. Richardson, in his patent of June 14th, 1853, employs rough Epsoms and fluor spar for this purpose. In some manufactories of sulphate of magnesia the rough Epsoms are calcined at a high temperature in order to convert the iron and manganese into insoluble oxides. This operation is attended with considerable loss of magnesia, even with the addition of magnesia to the impure Epsoms previous to calcination. To obviate this loss Dr. Richardson employs one part of fluor spar for every four parts of the sulphates of iron or manganese present in the impure Epsoms, together with the ordinary quantity of magnesia, and calcines this mixture at a very low temperature. Double decomposition ensues between the metallic sulphates and fluor spar, while the metals are rapidly peroxidized and rendered insoluble. The calcined materials are lixiviated and treated in the usual way for obtaining pure Epsom salt, while the metallic oxides may be employed as a colouring material.

Mr. Oliver's process, patented March 16, 1853, consists in the employment of a hydrate of magnesia, obtained either by decomposing a solution of chloride of iron by means of calcined magnesian limestone, or by decomposing the chloride of magnesium contained in a mixed solution of chloride of calcium and magnesium, to decompose a solution of sulphate of iron. To obtain sulphate of magnesia by this process a warm concentrated solution of sulphate of iron is added to the hydrate of magnesia obtained as above mentioned, whereby a solution of sulphate of magnesia is obtained, and hydrated oxide of iron precipitated.

Manufacture of Sulphate of Magnesia from native Carbonate of Magnesia.—Another method of manufacturing sulphate of magnesia is that patented by Mr. Ward, July 6th, 1846, who employs for this purpose the native carbonate of magnesia, the previous calcination and washing as practised in the manufacture of Epsom salt from magnesian limestone being thus dispensed with. Mr. Ward prefers the native carbonate of magnesia which is imported into this country from Greece. The carbonate previously reduced to fine powder is put into a leaden cistern, and dilute sulphuric acid poured on it sufficient in quantity to form a saturated solution, or until the specific gravity of the solution reaches 1.165 ; sulphuric acid of sp. gr. 1.750 being preferred for this purpose as the heat produced by mixing this acid with water assists in dissolving the magnesia. The clear solution of sulphate of magnesia thus obtained is then pumped into another vessel to be evaporated and afterwards crystallized in the usual way.

Instead of the native carbonate of magnesia above mentioned, Mr. Ward also uses the residuary magnesia obtained in his patent soda process of the same date.

Manufacture of Sulphate of Magnesia from Schist.—At La Guardia, near Genoa, sulphate of magnesia is made from the mixed magnesian and pyritous schist obtained in that locality. In this process the sulphur contained in the pyrites forms with the oxygen of the air sulphuric acid, which acid, combining with the metallic oxides of the pyrites and the magnesia, forms sulphates of iron, copper, and magnesia, on the addition to which of lime containing magnesia, a further portion of sulphate of magnesia is obtained, together with sulphate of lime and oxides of iron and copper. M. Mojon recommended the adoption of the following series of operations, which were afterwards adopted.

After having lixiviated the ore, which has previously been torrefied and exposed to the air, filter the lixivium, and evaporate it in a large copper cauldron till a pellicle is formed at the surface of the liquor, which is put for the present to crystallize in pans of glazed earthenware ; after the crystals are deposited, decant the liquor, and pour it into the cauldron in order to evaporate it again to a pellicle ; then put it to crystallize in other pans, and thus repeat the evaporations and crystalli-

zations till all the salts are crystallized, separating every time the portion crystallized at different periods; the sulphates of iron, of copper, and of magnesia not being equally soluble, nor retaining the same water of crystallization, do not crystallize at the same time, and have neither the same form nor the same colour. The sulphate of magnesia crystallizes the first, that of iron the second, the sulphate of copper the third; so that by the repeated evaporations and crystallizations we may obtain these salts separately, but we cannot determine the number of the evaporations and crystallizations which this operation requires, nor the time at which the one or the other salt crystallizes, these salts not being always entire in the same proportion, nor in the same quantity with respect to the ore. If we attend to the crystallization when the blue crystals of copper begin to appear, that is to say, to the third, fourth, and fifth (as they are always the last to crystallize), we unite together these last crystallizations which contain the sulphate of copper separated from the other salts. The first crystallizations containing the iron and the magnesia may be united together (always when we do not wish to separate the sulphate of iron on account of its little value); we dissolve it in boiling water, we pour into the solution lime water till the whole of the metallic sulphate is decomposed, which is easily perceived by pouring into it a little infusion of galls, which must not produce a black colour. After the lime has precipitated all the oxide, we filter it, and evaporate the liquor to a pellicle; by this means we obtain pure sulphate of magnesia.

"This process," says M. Mojon, "of which I have given a rapid sketch, when well examined, will be found to be the only one which can separate the sulphate of copper from the other two sulphates without decomposing them; it is at the same time the most advantageous for such an operation; besides, it neither requires too long a period of time nor a great expense; and from the profit which it produces in this case, we are well indemnified for the trouble which attends this operation."

(*To be continued.*)

CHEMICAL ANALYSIS OF THE MINERAL WATERS OF HARROGATE.

BY PROFESSOR A. W. HOFMANN.

Report addressed to the Chairman of the Water Committee in Harrogate.

Of the mineral springs which abound in the neighbourhood of Harrogate, the following ten were selected for examination, representing the principal varieties occurring in that locality.

A. *Sulphur Waters.*

1. Old Sulphur Well.
2. Montpellier Strong Sulphur Well.
3. Montpellier Mild Sulphur Well.
4. Hospital Strong Sulphur Spring.
5. Hospital Mild Sulphur Spring.
6. Starbeck Sulphur Spa.

B. *Chalybeate Waters.*

1. Montpellier Saline Chalybeate.
2. Cheltenham Saline Chalybeate.
3. Tewitt's Well.
4. St. John's Well.

The waters used for the estimation of the solid constituents were collected during the months of May, 1853 and 1854; the gases, partly in November, 1853, partly in February, 1854.

Qualitative analysis, performed in the usual manner, exhibited the presence of the following substances:—

BASES.	ACIDS, OR ELEMENTS REPLACING THEM.
Potassa	Chlorine
Soda	Bromine
Lime	Iodine
Magnesia	Fluorine
Protoxide of Iron	Sulphur
Protoxide of manganese	Sulphuric acid
Alumina	Carbonic acid
Ammonia	Silicic acid

Organic matter.

GASES DISSOLVED IN THE WATERS, OR RISING IN BUBBLES FROM THE WATERS.

Oxygen
Nitrogen
Carbonic acid
Carbonetted hydrogen (marsh gas)
Sulphuretted hydrogen

These are, with the exception of fluorine and manganese, the same constituents, the existence of which, in the Harrogate waters, has been pointed out by Mr. West. Iodine and bromine have been traced by the same chemist in the Old Sulphur Well; these elements are, however, present in nearly all the waters.

If the above-mentioned constituents be arranged according to the solubility of their compounds either in pure water, or in water containing free carbonic acid in solution, it may be assumed that the Harrogate waters contain

a. COMPOUNDS SOLUBLE IN WATER.

Sulphate of lime
Fluoride of calcium
Chloride of calcium
Chloride of magnesium
Chloride of potassium
Chloride of sodium
Sulphide of sodium
Iodide of sodium
Bromide of sodium
Carbonate of soda
Carbonate of potassa
Silica
Ammonia

b. COMPOUNDS SOLUBLE IN WATER CONTAINING FREE CARBONIC ACID.

Carbonate of lime
Carbonate of magnesia
Carbonate of iron
Carbonate of manganese
Alumina

The method of quantitative analysis which was followed, requires scarcely any special notice, since it differed in no essential point from that usually adopted for this purpose. Chlorine and sulphuric acid were determined in separate quantities of the water by means of nitrate of silver and chloride of barium; lime and magnesia together in the same portion of water respectively by oxalate of ammonia, and ammonio-phosphate of soda. The silica was estimated by evaporating a separate portion, and treating the residue with hydrochloric acid; the alkalies, by precipitating iron, lime, and magnesia, by baryta-water, repeatedly evaporating to dryness in order to remove small quantities of baryta from the solution, and weighing the mixed chlorides; the separation of the alkalies was effected in most cases by bichloride of platinum, in some cases their relative proportion was determined by the indirect process. The iron had been partly deposited from some of the waters by the time they arrived in London; it was, therefore, precipitated in a special experiment at the well by means of sulphide of ammonium from pretty large quantities of the waters, and ultimately weighed as sesquioxide. Lastly, the total amount of solid residue was obtained by evaporating the water, to which a weighed quantity of carbonate of soda had been added, and carefully drying at a temperature of from 248° to 266° F. (120° to 130° C.); exposure of this residue to a low red heat in contact with the air gave the amount of organic matter.

Bromine and Iodine.—Bromide and iodide of sodium, although present in quantities so small as to be incapable of being quantitatively determined with accuracy, were easily *detected* in most of the waters: from 1000 to 1500 grains of the solid residue obtained on evaporation were exhausted with water, the solution evaporated, and the residue boiled out with spirits of wine; the extract left on evaporation was again exhausted with stronger alcohol. In the residue left on evaporating this extract, both bromine and iodine were generally traced without any difficulty; in some cases, however, the treatment with alcohol had to be repeated. The bromine was detected by dissolving the residue, left on distilling off the alcohol, in a small quantity of water, decomposing the bromide by chlorine-water, and taking up the liberated bromine in a small quantity of ether, with which the liquid was agitated: the yellow colour which the ether assumed indicated the bromine. In order to trace the iodine, a portion of the same residue was dissolved in a small quantity of water, mixed with starch paste, and evaporated to dryness in a porcelain capsule,

at a gentle heat; on adding a drop of concentrated nitric acid to the mixture, the blue colour of the compound of starch and iodine made its appearance: in the presence of a bromide, the starch, where it came in contact with the *liquid* nitric acid, assumed a deep orange-yellow colour, and the colour of the iodine-compound appeared distinctly in those parts of the saline residue which were exposed only to the *vapour* of the bromine and the nitric acid: In this manner both elements could be readily detected in the same experiment.

The quantities of bromine and iodine appear to vary in the several waters, but I am unable to make a positive statement as to this fact, inasmuch as the different quantities of saline residue left on the evaporation of equal amounts of water compelled me to use very unequal portions for the purpose of testing for bromine and iodine. The quantities of saline residue actually employed were 1500 grains in the case of the Old Sulphur Well, the Hospital Strong Sulphur Spring, the Montpellier Saline Chalybeate, and the Cheltenham Saline Chalybeate Wells; 750 grains of that of the Montpellier Mild Sulphur Well; and 500 grains in the case of the Montpellier Strong Sulphur Well, the Hospital Mild Sulphur Spring, and the Starbeck Sulphur Spa; and lastly, 100 grains of the Tewitt's Well residue.

Fluorine.—The fluorine had to be sought for in the insoluble portion of the saline residue of the waters. This residue was tested by Dr. G. Wilson's excellent process. From 400 to 600 grains of the residue, consisting chiefly of calcareous and magnesian salts, were mixed with a small quantity of pure finely-divided quartz, and boiled for about an hour with concentrated sulphuric acid. The terfluoride of silicium disengaged in this manner was passed into water, the resulting hydrofluosilicic acid decomposed by ammonia, and the fluoride of ammonium, after separation of the silica by filtration, evaporated; gently heated with concentrated sulphuric acid in a platinum crucible, this residue disengaged hydrofluoric acid, which was recognized by its action upon glass. In the examination of several of the waters which had deposited rather a large quantity of insoluble matter, the presence of fluorine became at once perceptible on passing into water the gas evolved by boiling, with concentrated sulphuric acid, a mixture of the residue and quartz: a flocculent precipitate of silica was thrown down, which was considerably augmented on addition of ammonia. In those cases the etching was very rapidly effected, and to a considerable depth; in other cases, however, the separation of silica was scarcely perceptible, and the etching very faint. In some cases the etched lines became visible only in the film of moisture produced by breathing upon the glass plates. In none of the waters was found a sufficient amount of fluorine to admit of quantitative estimation.

Manganese.—Of all the methods suggested for the detection of small quantities of manganese, none yields more accurate results than the one discovered some years ago by Mr. Walter Crum. It consists in treating the iron precipitate which may contain the manganese with nitric acid, and adding a small quantity of binoxide of lead. If manganese be present, the liquid exhibits, as soon as the precipitate has subsided, the magnificent colour of permanganic acid. By applying this method to the insoluble portion of the saline residue, the presence of manganese in the Harrogate waters could be proved without difficulty, but the amount was not sufficient for quantitative determination.

Ammonia, which could be detected in all the waters, if considerable quantities were evaporated, with a few drops of hydrochloric acid on mixing the residue with recently-slaked lime, was likewise present in such a minute proportion that quantitative determination became impossible.

Alumina was detected only in one case by means of the blow-pipe reaction with nitrate of cobalt, after separation of silica and iron, and in this case not more than a mere trace was found.

All the waters were very carefully examined for *arsenic*, *antimony*, and *tin*, which have been found of late in so many mineral springs. But although large quantities of the solid residue obtained by evaporation were submitted to analysis, no trace of these metals could be detected.

No more successful was the attempt to trace the presence of *nitric* and *phosphoric acids*, or of *lithia* and *strontia*, in the Harrogate waters.

The *nitric acid* was tested for by means of sulphuric acid and sulphate of iron in the residue of a large quantity of water, evaporated with a few grains of carbonate of soda. *Phosphoric acid* had to be looked for both in the soluble and insoluble part

of the solid residue obtained by evaporating the water. Both were carefully tested by means of molybdate of ammonia, the insoluble portion after the removal of the iron.

In order to find *lithia*, the solid residue of the waters (the experiment was made with the following three waters, viz:—the Old Sulphur Well, the Hospital Strong Sulphur Spring, and the Cheltenham Saline Chalybeate) was repeatedly boiled out with water, the solution neutralized with a few drops of hydrochloric acid, evaporated to dryness, and the residue exhausted with alcohol. The saline residue obtained by distilling off the alcohol was then treated with a mixture of alcohol and ether. The solution thus formed neither exhibited the crimson-red lithia-flame when lighted, nor was it possible to obtain from it the difficultly soluble double salt of phosphate of soda and lithia.

Strontia, when existing in the waters, was probably present in the form of sulphate, and had therefore to be sought for principally in the insoluble portion of the saline residue. According to recent observations, however, sulphate of strontia is slightly soluble in water containing a considerable quantity of chlorides. In order, therefore, not to lose any strontia, the whole saline residue was submitted to the action of sulphuric acid, the excess of this acid expelled by ignition, and the residue of sulphates exhausted first by water and then by hydrochloric acid. The residue, consisting chiefly of silica, was fused with carbonate of soda, the product of the fusion exhausted with water, and the insoluble residue which was left, dissolved in hydrochloric acid. Addition of sulphate of lime to this solution produced the faintest turbity, which may have been occasioned by strontia. But unless the experiment be repeated on a very large scale, it would be hazardous to assert the presence of strontia. The experiment was made with the residue of the Old Sulphur Well, which contains a very large amount of saline matter.

(*To be continued.*)

THE CINCHONA BARKS, AND THE MORE IMPORTANT QUESTIONS WHICH IN THE PRESENT STATE OF SCIENCE AND COMMERCE RELATE TO THEM.

BY MM. DELONDRE AND BOUCHARDAT.

For some years the price of sulphate of quinine has continued to increase, in consequence of the monopoly in the commerce of the Peruvian barks.

This monopoly has been successfully combated to the great advantage of Europe, and France in particular, by the importation of bark from Columbia, which has produced a serious competition between it and Peruvian bark in the markets of Europe.

This importation has given rise to several questions of great interest relating to these barks, the bases which they yield, and their therapeutic properties. It is much to be desired, for the sake of science and of humanity, that these questions may soon be conclusively decided.

MM. Delondre and Bouchardat have undertaken the discussion of these subjects, from the belief that those who have devoted a considerable portion of their lives to any particular study, ought to make known their results for the advantage of younger men who may afterwards be more successful.

Their first memoir treats of the Calisaya barks and the barks of Columbia, with regard to their origin, the description of barks which are introduced into commerce, the yield of alkaloids, and lastly, the means of distinguishing the Cinchona barks yielding aricine.

It does not require to be proved, that in reference to the barks of Columbia and Calisaya bark, M. Delondre is alone able to speak with authority. His travels in South America, and his long experience as a fabricator, enable him to offer the evidence of his observations on the spot, of his commercial experience, and the results obtained in the factory.

M. Bouchardat has been specially engaged with the investigation of the barks yielding aricine, which it is important to distinguish from the Cinchona barks containing quinine and cinchonine, and whence so much misunderstanding has arisen.

One very important question, which is reserved until the end of the series of memoirs, is the determination of the physiological and therapeutic equivalent of each

of the febrifuge alkaloids, and which has engaged the attention of M. Bouchardat for many years.

Cinchona Barks considered solely with regard to Commerce and the Extraction of the Alkaloids which they contain.—Before the admirable researches by M. Bergen, or those which M. Guibourt has introduced in his *Traite des Drogues Simples*, and before the publication of Weddell's work, the history of the Cinchona barks was very obscure. But while rendering to those investigators the merit which is their due, it is necessary to endeavour to complete whatever they may have left unexplained, and to rectify whatever they may have given either imperfectly or incorrectly.

In the attempt to describe as briefly as possible the characters of the Cinchona barks, MM. Delondre and Bouchardat have deviated very little in the case of two or three species from the descriptions given by Weddell, because it appeared to them difficult to improve upon or even to equal his treatment of the botanical portion of the subject.

They have had a small number of plates struck off which represent the form, colour, and thickness of the barks, together with a brief statement of the localities whence they are derived, their relative proportion of febrifuge principles, and, as far as possible, any other particulars that might be deficient.

1. *Calisaya bark, flat with the epidermis.*—This bark is gathered in the forests of Bolivia, whence it is brought in serons, weighing seventy-two or seventy-five kilogrammes, to the ports of Cobija, Arica, and sometimes Islay.

It is an error to say that the barks are mixed at these ports; they arrive there as they are collected in the forests with more or less of discernment. After being dried they are wrapped in fresh hides, which in drying shrink in such a manner that they cannot be opened without its being noticed by the least observant. Moreover, there is no agent at those ports to whom the exportation of the barks is entrusted who would practise such a fraud.

The bark of the Cinchona Calisaya is pale reddish yellow at the inner surface, the texture perfectly uniform and compact. The outer surface is a darker brown, irregular, with longitudinal furrows and projecting tufts.

This bark, when chewed, has a decided bitter taste, is slightly styptic, and without astringence. The transverse fracture is purely fibrous; the fibres, which are very short, may be easily detached; they penetrate the skin with great ease, and occasion violent itching.

The quantity of alkaloid which M. Delondre has uniformly obtained from this bark amounts to about thirty to thirty-two grammes of sulphate of quinine, and six or eight grammes of sulphate of cinchonine for the kilogramme.

A gramme of sulphate of quinine precipitated by five grammes of tannin, gives 3.47 grammes of bitannate of quinine dry and friable, as stated by M. O. Henry. When precipitated by infusion of galls, the dry resinous precipitate amounts to double that quantity.

These facts the authors consider to be a sufficient argument against the employment of tannate of quinine in preference to the sulphate, by limiting its superiority solely to the slight bitter taste. For, without taking into consideration other objections, this preparation contains in the dry state barely one gramme of quinine in three grammes, when made with tannin, and only one gramme in seven when made with infusion of galls.

M. Delondre, impressed with the importance of the discovery of Pelletier and Caventou, determined, towards the end of 1828, upon sending out an agent to Bolivia for the purpose of ensuring the collection of the barks upon a large scale. This undertaking was not satisfactorily carried out, and was far from realizing his expectations. It was, however, the means of his obtaining the first and only specimens which had been seen up to that time of the bark, leaves, flowers and fruit of *Cinchona Calisaya*, and of the juice obtained by incision, and of the bark of the roots of the same tree. These specimens still serve as the types of the true Calisaya, richest in alkaloid.

In 1835, after having practically assured himself in the course of a long experience, of the value of the barks from the same locality, he offered these specimens to the Société de Pharmacie, as illustrations for the lectures at the school, and published a notice* of them, together with the results of the analyses made conjointly with M. O. Henry.

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* *Journal de Pharmacie*, xxi., p. 505.

These results were as follow :—

1. The leaves and fruit of the Cinchonas do not contain the alkaloids found in the bark of the trunk and roots.

2. The bark of the roots contains a lesser proportion of these alkaloids than the bark of the trunk and branches.

3. The liquids obtained by incision contain the same substances as are extracted from the bark by water.

M. Guibourt,* in referring to this collection, remarks, "That the thick barks, instead of belonging to a single species of Cinchona, are derived from several, and this attempt has therefore been of little value for discovering the species of *Calisaya*." Weddell, however, says, "M. Delondre has recently received from Bolivia specimens of barks, leaves, flowers, and fruit of several trees, which he has reason to believe are those which furnish the bark in question. M. Delondre never pretended to interfere with the botanical question, which was and will be for a long time the occasion for a great number of controversies; he frankly confesses his incompetence, but he has procured at great cost these specimens, and after having, in the course of a long practical experience, assured himself of their value, has devoted them to the public benefit, to the purposes of education, and to provide commercial men with specimens of the species richest in alkaloid."

At that period the knowledge of the Cinchona barks was so limited, that Berzelius was misled by inaccurate statements, referring Cuzco bark to *Cinchona Calisaya*,‡ and giving the bark of *Portlandia hexandra* the name of Carthagena bark,§ remarking at the same time that the alkalies obtained from it had been administered in cases of intermittent fever without any favourable result.

Weddell places the *P. hexandra* among the pseudo-quinas, as coming from Brazil, the mountains of Parahybuna, in the province of Rio Janeiro.

For the purpose of showing the distinction that must be established between the scientific history and the practical knowledge of the barks with regard to the quantity of alkaloid which they yield, the result of an enormous operation is given.

In 1837 the proprietors of the Cinchona forests in Bolivia, Peru, and Chili, united their crops with those of Don Francisco de Los Heros, the most eminent among them in point of fortune, special knowledge, and loyal character, and empowered him to enter into a contract with the firm of Pelletier, Delondre, and Levaillant, for furnishing twelve thousand serons of bark.

The negotiation was concluded under the condition that the bark should yield 31.25 grammes of sulphate of quinine for the kilogramme.

M. Delondre was requested by MM. Pelletier and Levaillant to verify the quality of this bark, divided among the houses of Gibbs, of London, Santa Coloma and Co., of Bordeaux, and Charles Latham and Co., of Havre.

There was not the least difficulty with regard to the slight differences which were observed, and which are always found in the quilled barks with epidermis. A proportionate allowance was made for them by M. de Los Heros.

According to the works which treat of the Cinchona barks, there can be no doubt that in such a large quantity of bark it would have been possible to find a great number of varieties, as *Condaminia*, *Boliviana*, *Amarilla*, *Anaranjada*, *Micrantha*, &c. &c., and to mistake for them quilled barks, which are still called grey bark, and which are derived from the branches of the tree, whose trunk furnishes flat bark. But guided solely by the specimens which M. Guibourt regards as of little value for ascertaining the species of the *Calisaya*, M. Delondre restricted himself to ascertaining whether the whole yielded the proportion of sulphate of quinine stated in the contract. This yield has subsequently been confirmed in the fabrication, and even somewhat exceeded.

2. *Cinchona Calisaya in Quills.*—Epidermis rather thick, rugose, unequal, with annular fissures at regular distances, and in the intermediate spaces transverse as well as longitudinal cracks, more or less close together, frequently anastomosed, colour silvery white or iron grey. The inner surface is purely fibrous, of a reddish-yellow, texture uniform; transverse fracture, very resinous at the exterior, with fibres.

This bark is derived from the branches of the tree, whose trunk furnishes the flat

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* *Traité des Drogues Simples*, iii., 134.
‡ *Traité de Chimie*, v., 186.
§ *Traité de Chimie*, vi., 221.

bark. It yields less alkaloid than the last-mentioned bark; the yield varies from fifteen to twenty grammes of sulphate of quinine, and eight or ten grammes of sulphate of cinchonine for the kilogramme.

3. *Cinchona Carabaya.*—This bark is brought from the province of Carabaya by way of Aréquipa, to the ports of Islay, and sometimes Arica; its thickness is from two to three millimeters throughout the whole of the serons, which, like those of the previously named barks, weigh from seventy-two to seventy-five kilogrammes.

The inner surface is of a rather uniform texture but very brown, and frequently distorted by drying. The exterior surface, instead of presenting longitudinal furrows, is covered with small projecting points, which are almost black, and are formed by the adhesion of the epidermis, and sometimes cracked across. The transverse fracture is clean, with fine fibres at the interior, and a resinous layer outwardly. This bark sometimes comes in very thin pieces, which yield scarcely twelve grammes of sulphate of quinine; but taking the thickness above stated as the normal, this bark yields fifteen to eighteen grammes sulphate of quinine, and four or five grammes sulphate of cinchonine.

Cinchona from Columbia.—The Pitaya bark, which M. Henry has shown to be very rich in febrifuge alkaloids, has been more specially called Columbian bark.

What is to be understood as Columbian bark? It is very evident that this general term is indefinite. Carthagena is a port in New Granada, and all the barks called Carthagena bark are therefore Columbian barks, because New Granada is a part of Columbia; moreover, all the barks which Mutis discovered in New Granada are Columbian barks.

Cinchona Barks known in Commerce as Carthagena Barks.—There are several kinds of barks collected in the forests of New Granada and exported for Europe at the ports of Carthagena, Sainte-Martha, and Maracaybo, in serons of fifty to fifty-five kilogrammes. Among them will be found all the barks of Mutis.

It is not without astonishment that we read the following passage in M. Guibourt's work:*—

"A man who has gained a great reputation as the original discoverer of Cinchona bark, but who has only contributed to invest the history of these barks in *confusion* and *obscurity*, is Mutis, the Spanish botanist, who went to New Granada in 1760, where he remained for some time, and who was led by the desire of gaining a great reputation with regard to the Flora of Peru to commit the errors which are found in the works recently published. In order to justify this *severe judgment* it will suffice for me to remark that Mutis, who was unable to recognize the true Peruvian bark, has applied this term to totally different barks which grow at Santa Fé, and whose value is next to nothing. Thus, his much vaunted orange bark is only an extremely fibrous kind of *Calisaya* of very inferior quality. His red bark, the bark of his *Cinchona oblongifolia*, is nothing more than the inferior bark since termed *Cinchona nova*. His yellow bark, differing from that of La Condamine, and produced by his *Cinchona cordifolia*, is what is called Carthagena bark at the present day."

After this violent diatribe against an eminent man whose high merits have been recognized by his contemporaries, it is pleasant to call to mind the noble justice rendered to Mutis by Linnæus: *nomen immutabile quod nulla ætas unquam delebit!*

The testimony of the celebrated Humboldt and Bonpland may likewise be brought forward. They travelled through the same forests, and have confirmed all his observations, the truth of which appears still more forcibly when we remember the large proportion of alkaloids found in the barks of New Granada.

The name of Mutis has, indeed, been rendered imperishable by the discovery of these barks, as the names of Pelletier and Caventou have been by their discovery of sulphate of quinine.

Orange Yellow Cinchona of Mutis.—The inner surface of this bark is orange yellow with a shade of red; the thickness is from two to eight millimeters throughout the whole of the serons; the texture is uniform as in Calisaya bark, but less compact; and the fibres are longer. The outer surface is almost smooth, and of a more reddish-yellow than the interior, sometimes striped transversely with whitish traces of the very thin epidermis. The transverse fracture is ligneous within, and of a cork-like texture externally. It has a decided bitter taste,

* *Histoire Naturelle des Drogues Simples*, iii., 96.

approximating to that of Calisaya bark, slightly styptic, with a rather persistent and slight aroma. The thinnest pieces of bark, which are almost quilled, and are mixed with the thick bark in the serons, do not differ from it either in bitterness or colour, but they yield less alkaloid.

The average yield is fifteen or sixteen grm. sulphate of quinine, and six or eight grm. sulphate of cinchonine for the kilogramme. A gramme of the sulphate gives tannin or infusion of galls precipitates of the same weight as the Calisaya bark.

Some months since M. Delondre submitted to M. Guibourt a large specimen of this bark in order that he might be convinced by his own analysis of the error into which he had fallen with regard to it.

Yellow Bark of Mutis.—This bark presents at first sight the appearance of the preceding, but the colour of the interior is ochre yellow, the texture is less uniform, and it has sometimes rather deep longitudinal furrows. The surface is more or less wrinkled, of a duller yellow, with more whitish traces of epidermis, and in places crusts, which may be easily removed, and leave deep hollows.

The taste, besides being bitter, is slightly acid and more styptic than that of the orange yellow bark. The yield is twelve or fourteen grm. sulphate of quinine, and five or six grm. sulphate of cinchonine for the kilogramme.

According to the experiments of M. Delondre the sulphate of quinine furnishes more readily than any other, although in small proportion, the peculiar crystals to which he and M. O. Henry gave the name of Quinidine in 1833, and which have been noticed again recently, notwithstanding the observations published by them in 1834, for the purpose of proving that these crystals consist of quinine in a state of hydration.

Red Bark of Mutis.—This bark is from two to five millimeters in thickness throughout the whole of the serons. Within the colour is reddish-brown, the texture is very compact, with several deep longitudinal furrows in the thick barks. The exterior is brighter, red, uniform, and spongy, covered in some parts by a very thin epidermis of a dirty white, very adherent, and at other places with crusts, which may be detached easily and leave deep hollows, as in the preceding bark. The transverse fracture is slightly pink with thin fibres at the interior, and suberoze at the exterior. The bitter taste is readily perceptible, and is persistent without astringency, but without the slightly aromatic taste peculiar to the orange yellow bark.

The inner surface of the young bark, which is quilled, does not differ in point of colour ; the texture is more uniform, and it is more rugged externally, and sometimes cracked.

Among the barks imported from New Granada this arrives in smallest quantity. It yields twelve or fourteen grm. sulphate of quinine, and six or seven grm. sulphate of cinchonine. Treatment with tannin and infusion of galls gives the same results as the preceding kinds. The sulphate of quinine obtained from this bark furnishes most readily and abundantly, according to the experiments of M. Delondre, the crystals which are regarded as a peculiar form of sulphate of quinine.

According to the experiments of MM. Delondre and Henry this sulphate is perfectly soluble in sixty parts of ether and sixty parts of ammonia, while the sulphate of quinine obtained from Calisaya, Carabaya, and the orange yellow bark of Mutis is perfectly soluble in eight parts of ether and two parts of ammonia, according to the modification of the same process proposed by MM. Bussy and Guibourt.

A gramme of sulphate of quinine, according to this method, was dissolved in hot alcohol (36°), the solution filtered and added to two grm. ammonia, and mixed with water until it became milky. The crystallization commenced after the lapse of thirty-six hours, but was not marked until after several days. The sulphates obtained from the red and yellow barks of Mutis, treated in the same way, crystallized after several hours' rest in small plates.

The difference between these sulphates consists, therefore, according to MM. Delondre and Henry, in the greater or less facility with which they yield these peculiar crystals.

M. Delondre lays much stress upon these details, because it was in the case of a parcel of 200 serons of this bark, which he had occasion to work up, that the controversy, already existing abroad, as to the merits of quinine and quinidine, was again revived.

M. Bussy referred him to the experiments previously made in conjunction with M. O. Henry for the purpose of estimating the value of this product as a substitute for sulphate of quinine, and perhaps, as he says, preferable in some cases. However, M. Delondre retains his conviction that there was not anything new or useful in the results which he had obtained, for if the peculiar crystals, called quinidine, were separated, the price would be exorbitant. The safest and most economical substitute for sulphate of quinine is cinchonine, which is naturally associated with quinine in all the Cinchona barks, and which can only be separated from it by chemical treatment. Moreover, sulphate of cinchonine costs five francs for thirty grm., while the price of sulphate of quinine is fourteen or fifteen francs ; and during more than a century, Cinchona barks containing a large proportion of quinine have been employed by preference.

M. Delondre has likewise given a large specimen of this red bark to MM. Bussy and Guibourt, because it was hitherto little known and is still very rare.

It was difficult to estimate its value, because in the works which mention it it is confounded with the bark improperly called *Cinchona nova*, and which is not a Cinchona at all.

Red Cinchona of Cuzco.—This bark is gathered in the forests of Santa Anna in the province of Cuzco, and arrives at the ports of Islay and Arica in serons of seventy-two to seventy-five kilogrammes.

M. Weddell, in reference to this bark, says :—"I have visited the forests in which the *Cinchona scrobiculata* grows, in company with M. Delondre, and it is in remembrance of the services which he has rendered to the scientific knowledge of the Cinchona barks that I was desirous of dedicating to him one of the species which we have examined together ; but I have found that my *Cinchona Delondriana* cannot be regarded as specifically distinct from *C. scrobiculata*, to which I have therefore referred it as a simple variety."

This is one of the barks which M. Weddell has described with the greatest care and accuracy, and of which he speaks with peculiar weight, as in all cases when he describes what has fallen under his personal observation. We need do no more, therefore, than copy him *verbatim*, suppressing, however, his remarks on the chemical and commercial peculiarities of the bark :—

"Bark flat, from five to ten millimeters thick, outer surface of a dull red, marked with some transverse linear impressions more or less irregular, and, finally, in dots ; but more rarely an exfoliation of the cellular tunic, as in the Cinchona Calisaya, with the confluent digitate furrows and the separable tufts. The inner surface is uniform, with a fine straight grain of a fine reddish orange colour, more or less bright. The transverse fracture is more or less suberous or spongy, outwardly, according to the thickness of the cellular layer, and partaking at that part of the colour of the outer surface of the bark. It is very fibrous inwardly, with long flexible fibres somewhat frequently foliaceous, and of a brighter colour than the cellular layer. The longitudinal fracture, like the transverse fracture, is wanting in uniformity of colour, presenting at the surface numerous splinters with sparkling points less marked than in Calisaya bark, and with a greater number of more visible medullary rays. The bitter taste is tolerably strong, readily developed on maceration, very styptic, but less so than the quilled bark."

The quilled bark is not met with in commerce. That which M. Delondre collected in the forests as a specimen yielded scarcely six or eight grm. of sulphate of cinchonine, while the flat thick bark yielded regularly four grm. sulphate of quinine and twelve grm. sulphate of cinchonine. Nevertheless it appeared indispensable to describe this bark among the specimens on account of its perfect resemblance to the quilled Calisaya bark.

MM. O. Henry and Delondre have, in the memoir which they submitted to the Académie Impériale de Médicine in November, 1852, pointed out the necessity for not rejecting any kind of bark on account of the discredit which people are desirous of throwing upon those received from New Granada, and upon the alkaloids which they yield. It has likewise been attempted some months since to exclude the grey Cinchona from the Materia Medica, and it is useful, in reference to this subject, to direct attention to the excellent observations of M. Soubeiran :*—

" . . . It is not that there is bad grey Cinchona in commerce, since bad yellow barks are met with quite as abundantly, and it is necessary to make a

* *Journal de Pharmacie*, October, 1852, p. 302.

selection in one case as well as the other. There remains then the large percentage of alkaloid, with regard to which the yellow bark has the advantage when it is to be employed as a febrifuge, but the necessity for which is far from having been proved when the bark is given in small doses as a tonic. Whoever rejecting all prejudice examines with calmness both kinds of bark, and always comparatively, will find that this much-abused grey bark possesses some qualities which are not met with in the same degree in its antagonist the yellow bark. It is less bitter, but aromatic, and rather astringent than bitter. It yields a larger proportion of substance soluble in water, and for each of these reasons it may claim the advantage. I have yet to learn, that because it forms the basis of officinal preparations, the faculty has on that account ceased to prescribe those preparations, and with advantage; and it would, I think, be very difficult to cite any instances in proof of its inferiority, unless in cases of an entirely anti-periodic action. The yellow bark and the grey bark are both barks of good quality, but in different ways. When a new *codex* is made, introduce preparations of each kind of bark, so that medical men may examine them, for it is only when experience shall have led to a knowledge of their respective qualities that any preference can justly be given to one or the other."

It has already been stated that the yield for a kilogramme of the barks was for

	Sulphate of Quinine.	Sulphate of Cinchonine.
Calisaya Bark	32 grm.	8 grm.
Orange-yellow Cinchona of Mutis	16	8
Red Cuzco Bark	4	12

In operating separately upon thousands of kilogrammes, the yield for each kind of bark scarcely varied at all.

However, in the hope of arriving at a more conclusive proof of the necessity for admitting all kinds of Cinchona barks, M. Delondre has operated upon the following Barks, the yield of which was,

Kil.	Grm.		Kil.	Grm.			Kil.	
51	200	sulphate of quinine,	12	800	sulphate of cinchonine	from	1600	Calisaya
25	600	"	12	800	"	"	1600	Orange-yellow
6	400	"	19	200	"	"	1600	Red Cuzco

After having repeated the same operations during several months, M. Delondre obtained from those quantities of bark mixed a constant product of 108 kilogrammes sulphate of quinine and 20 kilogrammes sulphate of cinchonine. The sulphate of quinine obtained was perfectly soluble in eight parts of ether and two parts of ammonia, and not a trace of cinchonine could be found in it. The peculiar crystals called quinidine were not formed until after several days had elapsed, as in the case of the sulphate of quinine obtained from the best quality of Calisaya bark.

These results are obtained not from laboratory experiments, but from the ordinary course of manufacture followed by M. Delondre, and are made known with a view to encourage the collection of all kinds of bark without reference to private interests.

The Calisaya bark will always hold the first place for richness in alkaloid; but if its price becomes too high, or the collection of it more difficult, or if the Bolivian government prohibits for a time the exportation, as has already been done several times for the purpose of raising the price, it will then be necessary to remember that the forests of New Granada and several other parts of America are capable of yielding a supply of bark.

It follows from the experience of M. Delondre, that the whole of the barks possess certain properties, which are mutually serviceable in the manufacture of quinine, and that no one should be rejected, for, by mixing them in accordance with their known characters, the alterations of which sulphate of quinine is capable of experiencing may be prevented.—*Répertoire de Pharmacie*, March, 1853.

NOTICE OF THE "CALIFORNIA NUTMEG."

BY PROFESSOR J. TORREY, M.D.

About a year ago, I received from the late Mr. Shelton, who had just returned from San Francisco, a specimen of what was called the *California Nutmeg*. I immediately considered it a species of Arnott's genus Torreya, belonging to the order Taxineæ of the great natural family of Coniferæ. It had been discovered but

a year or two before Mr. Shelton left the country, and had already attracted considerable attention, not only from the beauty of the tree, but from the singular character of the fruit and kernel, the latter strongly resembling the common nutmeg. Indeed, it has been frequently stated in letters from California that the nutmeg is a native of that country. The foliage has the form and deep rich green of the Florida species, or *T. taxifolia*, as well as of the yew; but the leaves are much larger, being from an inch and a half to two and a quarter inches long. They spread out on two sides, and are tipped with a sharp rigid point. The fruit, as it may be popularly called, is about the size and form of a greengage plum, and in the dried state has a pale olive colour, but this may not be its natural tint. The outer covering is a thick, fleshy, nearly closed urceole, or dish, which completely invests the seed, and closely adheres to it, except near the summit. It is smooth and even, and soft to the touch. The seed is usually oblong, and greatly resembles a large pecane nut, but frequently it is more ovate. The shell is smooth, thin, and fragile. On each side, near the summit and just below the non-adhering portion of the dish, is a perforation, communicating with an interior canal, similar to what I described in *T. taxifolia*, and the use of which is still unknown. The kernel is conformed to the shell, and has the external and internal appearance of the nutmeg. When cut transversely the resemblance is perfect. The seed, however, is wholly destitute of the delicate aromatic odour of the oriental spice, for it has the strong terebinthine character of the Coniferæ. Neither is the fleshy covering of any known use. It is more probable that, like the fleshy cup-a-berry of the yew, it is of a poisonous nature. Still the discovery of this tree is interesting to the botanist and to the horticulturist. But two other species are known besides. One of them (*T. nucifera Sieb. and Zuce*) is a native of Japan, and the other has only been found hitherto in Middle Florida, in very confined stations. The latter is erroneously stated by Zuccarini* to have a seed as large as a walnut, by which he undoubtedly means the *Juglans regia*, or Madeira-nut, as it is called in the United States.

As an ornamental tree, the California nutmeg deserves to be extensively cultivated. It must be hardy, as it grows on the mountains, where the winter is very severe.

The enterprizing Messrs. Parsons and Co., of Flushing, sent out a person to California for the express purpose of collecting the ornamental and useful plants of that country, and among other varieties, he obtained, last year, some ripe and fresh seeds of the Californian nutmeg. These germinated freely, and, when I saw the young plants last October, they had a healthy appearance, and had attained a good size. I have lately heard, also, that Mr. Lobb, an English collector, who has been exploring California for several years past, has sent seeds of this tree to England.

I close this notice with a short technical description of the new Torreya, which may be called T. Californica.

T. foliis distichis, brevissime petiolatis, cuspidatis pungentibus subconcoloribus; floribus foemineis solitariis sessilibus; seminibus oblongis, disco carnoso clauso.

Hab. Upper part of the Yuba and Feather Rivers, on the western slope of the Sierra Nevada of California.

Differs from *T. taxifolia* in the leaves being much larger, and not glaucous underneath, as well as being furnished with a sharper and more rigid point. The seed is longer, and the fleshy covering much thicker.—*New York Journal of Pharmacy.*

EARLY CLOSING ASSOCIATION.

On Tuesday, the 11th July, a public meeting of Chemists and Druggists, employers and assistants, was held, under the auspices of this Society, at a quarter to five o'clock in the morning, at the Freemasons' Tavern. There was a very numerous and respectable attendance.

Mr. Peter Jones, of Norton Folgate, was called to the chair, and having explained the object of the meeting, said the subject which they were assembled to consider was one which intimately concerned their interests and well-being. It was whether it was practicable to close the shops in their trade at an earlier hour in the evening; and if so, what would be the best means of carrying so desirable a change into effect? The early Closing Association, with the assistance of their indefatigable

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* In Endlich Syn. Conif., p. 241.

Secretary, Mr. Lilwall, had effected great benefit with reference to other trades, but it was much to be deplored that no good effect had yet resulted from their exertions to emancipate the Chemists and Druggists from the excessive toil to which, under the present system, they were subjected.

The Association had, however, now taken the matter in hand in earnest, and there could be no doubt that their efforts would be crowned with success. There certainly was no class of young men more deserving of such benevolent endeavours in their behalf than the Retail Chemists and Druggists' Assistants, as any one acquainted with the evils attendant on the present system must at once admit.

Previously to his entering into business, about twenty-three years ago, he was employed at a west-end establishment, and not only had he to work from seven o'clock in the morning until eleven o'clock at night, and on Sundays as well as week-days, but it was not unusual for him to have his rest disturbed during the busy season, twice or three times in the night besides. And he believed the same state of things still existed at the west end of London and elsewhere.

Most of the young men who entered the business were persons of education, intelligence, and respectability, whose misinformed parents or guardians had brought them up to the business of a Chemist and Druggist, considering that it was a light genteel business, free from arduous labour. Was it not monstrous that such a class should be subjected to what they were daily called on to endure? He was perfectly assured from his experience in the trade, that no necessity existed for keeping their shops open from early in the morning till late at night, and on Sundays as well as week-days, and he would state why he entertained this opinion. Some years since he became so disgusted with the increased toil of business, every day being alike—Sundays and week-days, that he determined at all hazards to close his shop entirely on the Sunday, and for the last six years, except on occasions of necessity, his establishment on that day was hermetically sealed. If such an arrangement were injurious to the interests of the community, he would not for a moment advocate it, for he held that it was the duty of the Chemist and Druggist to supply necessary medicines at all times, by day or night. This, no doubt, was a great drawback to their business, but it was one of those which could not be avoided. He quite concurred in the justice of the observation of Dr. M'Caul, when conversing with the reverend gentleman some time since, on the subject of Sunday closing; he said that "to supply necessary medicines on the Sabbath was not only an act of mercy but an imperative duty." But could not persons requiring medicines ring the shop-bell instead of the shop being kept open on the Sunday, and could not his (Mr. Jones's) practice be adopted, that of posting a notice on the door, stating that nothing but necessary medicines would be supplied on the Sunday. He would engage to say that, if such plan were adopted, and the Chemist *adhered strictly to his principle of supplying medicines only on the Sunday*, in less than three months there would be very few unnecessary rings at his bell, and the Sabbath would thus become what it ought to be in a Christian land like this—a day of rest from labour. He was fully confident also, that every Druggist's shop might be closed at eight o'clock in the evening during the week without prejudice to the interests of trade or inconvenience to the public. He was so satisfied of this, that he proposed shortly to close his shop at eight o'clock, and thus show to the trade and the public that one Chemist at least is prepared to incur the risk of whatever pecuniary loss there may be, for the sake of carrying out a great principle. For it did not necessarily follow, that because the Druggist's doors were closed the public should be debarred the privilege of procuring necessary medicines, as it would be the duty of every Chemist, as well as his interest, to have a competent person always at hand to supply such wants. It would be seen, therefore, that this arrangement, whilst securing the public every proper facility for supplying its real necessities, would be attended with great benefit to those engaged in the trade, inasmuch as in the case of each establishment, all the hands but one might be set at liberty at an early hour, and thus have an opportunity for mental improvement and bodily recreation. He would now leave the matter in their hands, having thus given them his experience, which he believed in the main to be the experience of all those who had been in the trade as long as he had. He trusted that they would discuss the resolutions to be submitted to them, calmly and dispassionately, and that they would bear in mind, that by steady perseverance in a good cause (and this cause was a just and righteous one) every obstacle must eventually give way, and he had good reason to hope that the time was not far

distant when the Druggists' Assistants would obtain at the hands of their employers that to which they were so rightly entitled, namely, opportunity for relaxation and improvement.

The CHAIRMAN then called on Mr. LILWALL, the Hon. Sec. of the Early Closing Association, who expressed himself much delighted at the room being so well filled. The calling of a meeting at the early hour of a quarter to five o'clock was quite an experiment. The Association had adopted that unusual course in consequence of having on several previous occasions invited persons engaged as Chemists to evening meetings, without being able to secure their presence. He had long been painfully impressed with the necessity which existed for a reform in the arrangement for closing in connexion with this important branch of business; but until that which was thus unmistakably supplied by that Meeting, he had had no earnest, no proof that a similar desire for reform existed in the minds of those engaged in the business in question. After the response to the call of the Association which the trade had thus given, he could no longer doubt either the universality or the depth of that desire. From particular investigations he had made some twelve months ago into the condition of the Assistant Chemists, he had found that that condition was indeed deplorable. For first, there was the evil of excessive hours of labour; then there were the evils of smallness of salary, and the liability to be called up at all periods of the night. He wished to be distinctly understood, however, that he believed the gentlemen who filled the position of principals were as humane as any other class of employers, and now that the movement had commenced in good earnest, would be found as ready as employers in other branches of business had been, to make the desired concession. Themselves more or less tied hand and foot to their business, as well as their Assistants, no doubt they had long, at least the majority of them, ardently wished for the change now sought to be effected, but were deterred from acting in the matter from the circumstance of the very evil which it was desired to overcome—the time-engrossing nature of their calling. Now that the Association had come to their assistance, he trusted that they would render it their valuable co-operation. He (the Hon. Sec.) would joyfully do all in his power to promote so excellent a cause. He had consulted those whose opinion he valued, and they concurred with him in deciding on eight o'clock as the proper hour for closing; and in using that term he did not mean a sort of make-believe, half-and-half sort of affair, but he meant the doors and windows being entirely closed and fastened. It would be of much more benefit to the Assistant to be relieved at eight o'clock than at nine; whereas it could not make the slightest difference to the public if it were arranged, as proposed, that there should always be some competent person to attend to the bell, in cases of accident and necessity.

The following resolution was then moved:—

"That this meeting rejoices that the Early Closing Association has thus taken steps to abolish the late-hour system, as existing in its worst form in connexion with the Chemists and Druggists' business, in most cases depriving employers themselves of well nigh all opportunity of family intercourse and needful recreation, and reducing their Assistants to a state of bondage as intolerable as it is unnecessary."

Mr. SYMES (an Assistant) seconded this resolution, when a gentleman from the body of the room observed, that what the young men so much wanted was opportunity for pursuing the studies connected with their profession, at a time like the present, when so much was required of them. Those, he said, who had helped to emancipate other slaves had hitherto passed by those of his class.

After some explanation from the Honorary Secretary the resolution was put and carried unanimously.

Mr. WEBBER moved the next resolution, which was as follows:—

"That this meeting is of opinion, that the Chemists and Druggists' shops of London and its suburbs may be closed, without detriment to business, at eight o'clock in the evening, and during the whole of Sundays, providing it were arranged and understood that the public could, at any hour, by ringing the door bell, be supplied with medicine in cases of emergency."

He said it afforded him great pleasure to assist so good a cause, and to take part in the proceedings of so influential a meeting as the present one; a meeting which denoted a significancy that could not be assumed in any other way; and every man present might feel proud of having attended; and he trusted it mght be the forerunner of many such in the great cities of the United Kingdom, as well as in

the metropolis. The calling of the meeting at this early hour did credit to the Association, and would do great good to the general cause, which all present must have at heart, by thus enabling a body of sufferers, of another and different class, to express their opinions and record their convictions, and the circumstance of the compulsorily early hour could not but add weight to those opinions. Such must lead the public to wonder, and inquire into that condition, the stern necessities of which should have thus compelled the gentlemen now assembled to leave their beds at the dawn of day, and for once add three or four hours extra fatigue to their already overworked frames. This great and startling fact should arouse the sympathetic feelings of the community at large.

It was very well known that the inhalation of such atmosphere as is engendered by the burning of gas is highly pernicious to the human system. If this be so, he would ask what must be the lot of those who, in addition to this evil which is common to all shops, were compelled to breathe an air teeming with the exhalations from noxious and other drugs, many of which, although valuable as restoratives when administered judiciously, could not fail, in the present case, to add oil to that lamp which was always burning, and insidiously consuming the life-blood of most assuredly the hardest-worked of the public servants. It was more especially by the number of hours his services were required that the Chemist's Assistant was crushed both in mind and body, for whereas but few shops of any other description were open beyond nine o'clock at night, he was placed behind his counter from seven or eight o'clock in the morning until eleven and frequently twelve o'clock at night, thereby so shortening the period of Nature's sweet restorer, balmy sleep, as totally to incapacitate him from preserving his health of body or improving his mind, while recreation of any kind was quite out of the question. He (Mr. Webber) in his travels through different parts of Europe, found the hours of business varied considerably, but none approached in toil and tediousness to those of England. Again, if it were true that education conduced to sensitiveness, additional hardship was meted out to the Chemists' Assistant, for it was well known that he must have more or less of a liberal education before he could be qualified to compound the prescriptions of the faculty. There was a point which had not yet been touched upon—it was suggested by the writer of one of the letters read by Mr. Lilwall, where he stated his willingness to close at an early hour, provided his neighbours did so likewise. Now it appeared to him, that the writer seemed to think the public much more callous than he believed them to be. He could not concede his opinion that upon such a point they could be callous, feeling sure that when once it became known that a tradesman in any locality from a desire to promote the welfare of his Assistants closed at an earlier hour, instead of incurring loss, he would be a gainer by the increase of patronage that such liberality and good feeling would assuredly bring him. He did not doubt that they would secure the sympathy of the Physicians of the country, whose benevolence had become proverbial, and who had much influence with their customers. He concluded by expressing the pleasure it would afford him at all times to forward their object, either by his pen, his purse, or his presence.

Mr. Baldock, of Aylesbury Street, Clerkenwell, seconded the motion. He observed that, as one of those mentioned in the letter from Mr. Griffiths, read by the Hon. Secretary, he would be most happy to co-operate in carrying out the object of the meeting.

The resolution was then carried without a dissentient.

Mr. Symes moved the following resolution :—

"That this meeting respectfully and earnestly solicits the Chemists and Druggists to close at eight o'clock in the evening ; and that a committee be now appointed for the purpose of bringing the subject before the notice of the employers, and to take such other steps as may be deemed necessary to secure this much needed concession."

He said that, after the speeches which had already been delivered, it was unnecessary that he should do more than merely move the resolution.

Mr. Brown seconded the motion.

Mr. Burden said he begged to support the resolution. He came before them as an employer, though he had been an Assistant, and had felt the evils which they had met together to denounce. Since he had been in business for himself he had endeavoured to carry out practically the sentiments contained in the resolutions

before the meeting, and he had been induced for his own benefit and for that of those in his employ to shorten the hours of business, and as much as possible to diminish Sunday trading. Referring to the Pharmaceutical Society, he observed that he thought a greater degree of success would have attended the various means they have employed for scientific advancement, and that the benches in their lecture-room would be better filled, were the hours of labour shortened, and time afforded for digesting the mental food, which could not be looked for under the present system of business. His experience was decidedly in favour of shortening the hours in the evening, and of cutting off all unnecessary trading on the Sabbath. He had found that the former led to an increased despatch of business. It was his opinion that Physicians generally did not write many prescriptions after six o'clock, and that orders that came in after eight, could, in most cases, be given before that time, being delayed because the customers were aware that any time before nine or ten o'clock is, under the present system, time enough. Were it to be known that the hour of closing was eight o'clock, the public would be led to conform to it to a great degree. Of course, he did not forget cases and wants of sudden emergency, but those cases, *in fact*, were very rare: nor would it do to have no one in attendance to meet those cases; but little would be required of the Assistant under those circumstances. And in the instances where he would thus be deprived of physical recreation, he would be enabled at least to have bodily *rest*, and to enjoy mental relaxation. Nor did the argument of sudden emergency serve the advocacy of long business hours, as on the same plea they might very reasonably be open during the whole night, and the Assistants be required to keep watch. He believed that if a united effort were made to shorten the hours of business, together with greater attention during those hours, to the wants of the public, the public would benevolently acknowledge the effort, and a great improvement on the present system would result. With regard to Sunday trading, he had ever set his face against it, by generally refusing to supply all articles that were decidedly non-medical and unnecessary. By adopting this plan he had the happiness of feeling that he was not the means of preventing any young man attending the house of God upon each Sabbath day. By perseverance in this plan he had materially reduced the demands of business on that day; it had, in fact, become quite unimportant, and free from all the petty worry and anxiety of an open retail shop. He could bear this testimony to the success of the plan, that he had not known of one instance of disappointment to a customer that were worth notice, while he had continual assurances from persons in all stations, of the most generous regard for the principle he had adopted, and of every reasonable desire to conform to it. He believed that in these principles he stated the views of many respectable Chemists of the metropolis.

He must, however, remind young men that the success of this movement must very much depend on themselves. If employers were induced to close their shops earlier, Assistants must be stimulated to increased attention and diligence in their employment. The calling of a Dispensing Chemist was one of peculiar anxiety, requiring, indeed demanding peculiar concentration of attention to every minutia of the subject in hand. He must repeat, therefore, that their ultimate and lasting success must depend greatly on the young men themselves.

In conclusion, he must congratulate the meeting that the cause of the Chemists and Druggists had been taken up by the Early Closing Association. This it was that induced him to attend this meeting, knowing the magnificent results that had attended the efforts of the Association in other branches of trade, and that thousands of young men were indebted to its powerful aid for a great increase to their personal happiness and their moral elevation. In proof of this he need only refer to the Young Men's Christian Association, which had resulted from the working of this Association. He felt sure that if the Association took the Chemists' Assistants under their wing, and the whole body made a noble effort, the result would be, if not all that could be wished, yet such a degree of improvement as would raise their habits of business from the level of the gin palace and tobacconist, to those which would give a character to their calling and diffuse a happy influence through their future life.

The Chairman said, that before putting the resolution, the meeting would perhaps indulge him with the privilege of making a few remarks confirmatory of what the last speaker had said. His experience of Sunday closing was, that it was not injurious but beneficial to those who practise it. He was sure the public might

be relied upon to come forward cheerfully to assist such tradesmen as should resolve on closing their shops on Sundays. No one could have been beset with greater difficulties than hewas when he first adopted that arrangement—such was the competition in business that existed in his neighbourhood. There were six Chemists in his immediate vicinity, and none of them had adopted his practice of closing entirely on the Sunday; but he yet believed that he was no loser, but, on the contrary, a great gainer by the personal relief that it afforded to himself and all his household.

The resolution was then adopted.

A gentleman from the body of the meeting proposed a resolution, which was, that the names of certain gentlemen which were taken, should constitute a committee to co-operate with the Early Closing Association, in accordance with the third resolution. When he entered business some time ago in Scotland, Chemists, he said, were a most ignorant and degraded class, and he was astonished that such a system should be found to exist in England as now prevailed. Referring to the immediate subject, he found that hair oil and quack medicines, articles which could be obtained at any time, where what were principally sold at the hours objected to. He would readily give his co-operation, as an employer, in carrying out the object of the meeting. This motion, having been seconded, was carried.

A vote of thanks having been passed to the Chair, also one to the Hon. Secretary, and the same having been appropriately responded to, the meeting, which was a highly interesting one, and conducted in a spirit which augurs well for its success, separated.

WHENCE AND WHY COMES OPPOSITION?

BY MR. A. F. HASELDEN.

It has been said of nations, that when they are in a proper state to receive that great blessing of a free and civilized country, *liberty*, then, and there only, will it be accorded to them; then will they rise from slavery and serfdom, and take their stand side by side with the free and enlightened of the world. This truth applies equally to societies, families, and individuals. Every man has that within him which either makes or mars him, either renders him a good member of society, an ornament to his profession, an adept in his calling, a man whose acquaintance is to be desired; or, sinks him, according to the use he makes of it, into the condition of a mere labourer, a questionable character, or very often a nuisance to good company. In vain we look for the country, community, or even family where social happiness or the enjoyment of intellectual pleasure and advancement is not in a degree retarded by one or more members, who, having no real taste for the pure stream which flows from the abode of learning, would damp the ardour of those hastening onward to the goal.

Are the Chemists and Druggists without such among their numbers? Is the Pharmaceutical Society free from such? "I pause for a reply."

Do motives of gain, or feelings of jealousy, prevent any from making known such improvements as, during their hours of business, their moments of relaxation, their readings or investigations, may either fortuitously or by design come under their personal and immediate observation? If they did not think that others would pick up the loaves and fishes, benefiting perhaps by their experience, would they not be more communicative?—would they not find more orginal matter for publication?—would they not be seen more frequently together enjoying the *otium cum dignitate?*—would they not have their dinners, and their balls for the benefit of their Benevolent Fund? Let each answer for himself. Such appear to be some of the causes which have, and do still, disturb the progress and full development of the advantages likely to accrue from the establishment of the Pharmaceutical Society, and these impediments are mainly to be found amongst those who should have laboured for a contrary effect.

Another fruitful source may be discovered in the fact that some who are not doing so well as the more fortunate, give way to a feeling of envy, a feeling which should be scouted by every man of education, a feeling which annoys only the possessor, and renders him less capable of turning to advantage any

fortunate occurrence. Let me advise those who toil against the odds of situation or circumstances, to apply themselves assiduously to the wants of their immediate neighbourhoods, or if need be, beyond them, and if less inventive than others, having no original matter to offer, let them follow the example of our best theatrical managers, borrow from their neighbours, and we have no better at present than the French, study at least one of their scientific publications, and it may add both mentally and pecuniarily to their profits.

If these reasonings be correct, let each one individually, as though he were the Society, strive to advance, and not impede, its progress.

To look on the other side of the picture, let us rejoice that there are men who do and have done much to advance the position and elevate the educational character of the Chemists and Druggists, and whatever motive may be attributed to them, the fact remains the same, they have done good; let them not be discouraged, but call philosophy to their aid, and as Socrates chose a virago* for his wife, under the impression that if he could bear with her violence of temper, he should be able to meet with patience and resignation all other trials and vexations, so may the supporters of a good cause, remaining firm under the severer difficulties of opposition, be able to meet the smaller ones with cheerfulness and patience, until they have accomplished their wishes, and let those who differ, bear in mind that one kind action will make more friends than a whole life spent in frivolous and useless disputings, even though there should seem to be a certain amount of justice on their side.

Conduit Street, July, 1854.

THE FLUID POUND.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The letter on this subject written by "An Experienced Dispenser," which appeared in the *Pharmaceutical Journal* last month, has been previously inserted in the *Lancet* and the *Medical Times and Gazette*, where it has passed muster without comment. "Experienced Dispenser," in a second letter written to the last-named publication for Saturday, July 8th, states, that in your comment on his letter, you refer him to Mr. Murdock's letter, and says, "It would appear, then, by this statement, that the ℥xvj. avoirdupois is correct, but a moment's consideration must pronounce it to be wrong, and I am very much surprised that the *Pharmaceutical Journal* should have taken notice of such a letter, when they must be well aware that ℥xij. constitutes the lb. Apothecaries' weight, and every deviation from this weight is a decided error," and then "suppose, for instance, that the prescription is as follows: ℞. Tinct. Cinchonæ ℥j., decoct. Cinchonæ ad lbj. In the first article, the tincture, *Apothecaries' weight* would be observed, and in the second article, the decoction, avoirdupois. What can be more inconsistent than this mode of dispensing; and if this is to be admitted, the whole system is founded on the most absurd basis possible to be conceived." He then proceeds to set down the whole mass of Pharmaceutical Chemists as men ignorant of the most common things, saying, "It is really disgraceful in these days of enlightenment that there should exist the slightest doubt on such an essential point as weight and measure; and while the Pharmaceutical Chemist is receiving an education of a semi-professional man in learning chemistry botany, &c. &c., I do not think it would be out of place nor an ill-timed suggestion, for a course of lectures on the more important subjects. Why should not the pill, the mixture, the powder, weights and measures, the mode of preparing extracts, and particularly the concentrated infusions of which the Chemist at the present time is so ignorant, of the tincture, and the infusion, be fully discussed." Now, I think, if "Experienced Dispenser" would only study the weights and measures himself, he would learn that in dispensing the above-quoted prescription with the tincture, *Apothecaries' measure* would be observed, and not *Apothecaries' weight*, and as one ounce Apothecaries' measure of distilled water weighs exactly one ounce avoirdupois, and not one ounce Apothecaries', it is not

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* Xantippe.

inconsistent to dispense the avoirdupois pound of ℥xvj., because, in that case, both weight and measure are in the same proportion, whereas, if the Apothecaries' pound of ℥xij. were dispensed, the proportions would be different, thus producing the inconsistency complained of.

If, however, a strict adherence to Apothecaries' weights and measures be used, it would still be incorrect to dispense the pound of fluid ℥xij., because, as the pound is a quantity of weight and not of measure, we must weigh the Apothecaries' pound when used, and not measure it, we should then find that the pound weight of distilled water measured 13 oz. 1 dram 12½ ♏., and would be ever varying according as the various ingredients altered the specific gravity; and who ever heard of a medical man ordering a mixture of that uncertain size, or say that he intended the Apothecaries' pound to be used, and simply because it would be impossible for him to calculate the dose of the ingredients he was ordering in any reasonable time, supposing he ordered ℥j., ℥iss., &c., or so many table-spoonfuls to be taken for a dose, as is most frequently the case; but if so many parts were ordered, it would not be a matter of so much consequence whether ℥xvj. or ℥xij. was used as the dose of the principal ingredients would be the same in either case.

When, however, medical men adhere to the *old-fashioned system* of ordering the fluid pound. it is right to use the old-fashioned quantity of ℥xvj. for the fluid pound, and as a rule in dispensing, whenever any obsolete term is made use of, always use that which corresponded to it, and not a new approximation or a modern substitute.

I remain, Sir, yours respectfully,

EDWARD NORTHWAY BULT.

[We have received a letter from the "Experienced Dispenser," similar in substance to the quotations in the above communication ; and thinking it unnecessary to publish both, we give the preference to the one which is authenticated with the name of the author. With reference to the question at issue, we may observe that we do not pretend to decide which is right—12 oz. or 16 oz. All that we say is, that some medical men order a fluid pound, meaning 12 oz., others, and *we believe a large majority*, meaning 16 oz. This being the case, the only safe conclusion at which we can arrive is, that the fluid pound ought to be *discarded* as an *obsolete term*. Mr. Laird, of Dundee, has favoured us with a few observations on the subject, which tend to support the above conclusion. He states that a medical man, in whose service he was an assistant, held it (the fluid pound) to be 12 oz., another said 16 oz. Being now in business on his own account, he is obliged to depend on his own judgment to decide what is meant, or to apply to the prescriber. Custom usually regulates questions of this kind, in the absence of any positive authority, and, notwithstanding all that has been said on the other side, we have seen no reason to deviate from the opinion already given, namely, that whether right or wrong, custom has given the preponderance to 16 oz.—ED.]

SUGGESTIONS TO THE SOCIETY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Your having accorded the favour of publication to my letter of the 1st of June, which, I confess, I did not expect it would be thought to deserve, renders necessary a few lines to correct what is either a slip of the pen or printer's error. In the sentence beginning. "Let an examination," &c., and ending with the word "latter," this word should change places with "former" to make sense. In pointing out this mistake, I may perhaps be allowed to explain that it is not my intention to disparage science or extended knowledge in connexion with business, believing as I do most firmly their utility, and that they naturally lead to higher branches and a better character of it, but that ample business may be done, and properly, with ordinary qualifications, provided honesty of purpose and just principles guide the conduct of the trader.

Without these science becomes a curse, by placing additional weapons of offence against the public interest, in the hands of those who seek only their own aggrandizement or the furtherance of their own views.

In what I have now, and previously written, I do not seek controversy, of which there has already been far too much, but shall rejoice if ever I see the day when it may be said,

"Now sweetly smiling, peace descends,
And spreads her downy wings;
Each blessing in her train attends,
Each joy around her springs."

Such, I am sure, would be well for all, and being aware that others whose efforts may be expected to have more effect than my own, are equally desirous of it, and believing that "right will be done," and "truth prevail," eventually,

I remain, Sir, obediently yours,

London, July 6th, 1854. CHARLES SAMUEL.

MANUFACTURE OF SULPHATE OF QUININE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—In your last number of the *Pharmaceutical Journal* (July) appeared Messrs. Thwaites and Herapath's patent (enrolled 15th May, 1854) for the manufacture of sulphate of quinine.

In February last my patent agent, Mr. Dirks, sent you my specification for manufacturing sulphate of quinine without alcohol, and under the head of Correspondents you remark to Mr. Dirks, in February, that "you had received the specification too late for publication this month."

On the 2nd Nov. 1853, I sent to Dr. Herapath a sample of my patent sulphate for analysis, together with a sketch of my process. Dr. Herapath's report on this sulphate appeared in the March, 1854, number of your Journal; but in December (a month after Dr. Herapath received my process) he patents his process. That it is nearly identical with mine there can be little doubt, as my solvent, benzole, is one of the solvents he suggests, viz., fusel oil, turpentine, camphine, or *other hydrocarbon*. Whether Dr. Herapath's patent is an infringement on mine may be a question some day, but the receipt of my sample and process in November bears the appearance of suggesting to Dr. Herapath an evasion of my process, which he patents the following December.

As you have given Dr. Herapath's patent circulation in your Journal, it seems strange that you should have withheld mine, more especially after your above notice to Mr. Dirks in your February number; and I think if you do publish my specification some notice of the above dates is due to me, otherwise it will appear as if mine were an infringement and copy from Dr. Herapath's idea, whereas dates connected with my required analysis from the doctor prove just the contrary.

I remain, Sir, yours respectfully,

Chemical Works, Trinity Square, Southwark, July 31st, 1854. EDWARD HERRING.

[The specification was omitted as unnecessary, the process having been described in vol. xiii., page 209, of this Journal. On comparing the processes of Mr. Herring, Messrs. Thwaites and Herapath, and Messrs. Pelletier and Despretz (page 31 of our last number), we doubt the validity of the more recent patents.]

REVIEW.

THE ELEMENTS OF NATURAL PHILOSOPHY, OR AN INTRODUCTION TO THE STUDY OF THE PHYSICAL SCIENCES. By GOLDING BIRD, M.A., M.D., F.R.S., &c., and CHARLES BROOKE, M.D., M.B., F.R.S. The fourth edition, revised and greatly enlarged.

HANDBOOK OF CHEMISTRY, THEORETICAL, PRACTICAL, AND TECHNICAL. By F. A. ABEL and C. L. BLOXAM.

AN acquaintance, more or less intimate with natural science, is, at the present time, so universally recognized to be indispensable for many and desirable for all, that educational works on science acquire a far higher degree of importance than they formerly possessed. Although there is an abundance of works of this kind, the prevalence of such delusions as have but very recently been witnessed, shows that there is in the general public a vast deficiency of anything like correct scientific conceptions of nature. How far this may be owing to defective education, it is unnecessary for us here to inquire, we will rather consider what is the remedy to be applied in such a case—what facilities there are for acquiring a sound although

slender knowledge of natural science. For the great mass of those who are unable to enjoy the advantages of University education, books are the only means by the aid of which they can become acquainted with science. It is, therefore, in the highest degree essential that our elementary works should present the fundamental principles of science in a truthful, lucid, and forcible manner, and with a due regard to the probable mental relation of the student to the subject treated of. The first requisites, we had almost said the only requisites of the elementary work, are to develope in the student, clearly and adequately, the fundamental ideas upon which science is based, to render him familiar with the ascertained laws of nature as well as with the precise signification and value of the terminology employed in expressing them, to show him the relation existing between the several classes of phenomena, and to present to his mind theories, not as articles of faith, but as instruments of research. Such a book would contain but little of what is called *useful* information, still less would it answer for *grinding* purposes, nevertheless, we consider such a book would it be of very great service to a large class of students, if written in a popular style, for in spite of the sneers of those who either cannot or will not distinguish between clap-trap and pedantry, we are convinced that a sound popular treatment of any scientific subject is by far the most appropriate for an elementary work. The exposition of the philosophy and methods of scientific investigation by John Herschell, is alone a sufficient ground for this opinion.

Both of the works above named are intended for the use of beginners in science. Although the former has already acquired a considerable reputation, we could not have avoided expressing a most unfavourable opinion of it as it appeared in former editions, which were wanting in every one of the requisites we have pointed out as essential. In the present edition, however, the book has been partially purged of the inaccuracies and defects which it formerly contained. Some excellent chapters have been added, and some very necessary alterations have been made in the arrangement of the portion which treats of mechanics. Still we cannot regard the work as suited to meet the great want that exists for an introductory treatise on physical science. The principal defects are the use of a confused terminology, a disregard of natural sequence in the subjects treated of, a frequent tendency to deduce phenomena from theoretical axioms, and a disproportion in the space devoted to the several branches of science.

As an illustration of these objections we will point to the constant confusion of the terms *force*, *law*, and *power*. The abrupt manner in which the theory of atoms as well as the doctrine of forces are introduced, prior to the consideration of the phenomena which alone justify our use of the words *force* and *atom*, from which in part we derive our ideas of the things represented by these terms, and which are the only evidence of their existence. It is to phenomena that our observation is immediately directed ; it is to them that laws relate ; and it is from them that the ideas represented by the terminology of science have been derived ; and it is from them that the study of every science must commence, and by their aid alone that these ideas must be developed in the mind of the student.

It seems to be a great mistake to treat of physics in an educational work in the same way as geometry, for it is impossible by means of definitions to convey to the mind ideas of matter, atoms, force, &c., and to deduce from those definitions the characters of bodies. Thus, at page 2 we find impenetrability spoken of as "flowing directly from the definition of an atom ;" extension as "a necessary consequence of it ;" and figure as "essential to the existence of an atom." All this appears to be a misuse of the theory of atoms ; impenetrability, extension, and figure, are natural facts, obvious to the most ordinary perception, and altogether independent of the existence or non-existence of atoms.

The distinction drawn between internal and external forces is based upon nothing but an undue appreciation of the circumstances under which the corresponding phenomena are observed. There is no reason whatever for regarding the phenomena of cohesion or adhesion as the result of force appertaining to the atom in any higher degree than that to which the phenomena of gravitation are ascribed.

The explanation of the different states of aggregation as well as of the accessory characters of bodies is extremely unsatisfactory. In accordance with mechanical principles the opposition of an attractive force between atoms by a repulsive force would amount to a negation of an equivalent quantity of the attraction ; but this will not at all explain the characteristic peculiarity of the liquid state, which

appears to consist essentially in the relative mobility of the atoms. The cohesion of a body may be destroyed by powdering it finely without any signs of an approach to the liquid state. How far the dynamic theory of heat may account for these different states remains to be seen, but the character of mobility appears to point to a structural peculiarity in liquids which has hitherto escaped observation, and which may be analogous to that long since discovered in solids.

It is much to be regretted that writers on science will not abstain from gratuitous allusion to subjects with which science has nothing to do. The use of the term *matter* is in itself not free from objection, still less such a sentence as the following :—

"A stone being *mere inanimate matter*, and consequently absolutely inert, this phenomenon (fall) cannot depend upon any innate tendency to reach the lower part of the room, as one of the essential properties of matter is its utter incapacity to change its position."

In these few words a number of purely irrelevant questions are raised, with no possible other result than distracting the student's mind from the consideration of the facts before him—the phenomena of gravitation, as they are, and their laws.

The succeeding chapters on statics and dyamics have been materially improved, amplified, and corrected, and a chapter on the principles of mechanism added, which cannot fail by its simplicity to fix the interest of the student, and from its clearness and brevity to be of essential service to him.

The subject of heat is not treated in so ample a manner as it requires, and much of the space taken up by details of photographic manipulation might have been more appropriately devoted to it.

The second named work is intended to serve as a sort of guide to the student while working in the laboratory. It is full of useful directions with regard to manipulation and processes. The chemical history of the elements and their compounds is unexceptionable as regards accuracy and completeness for the present state of the science. It is, however, to be regretted, that it should not have been presented in a form more suited to the wants and conditions of students, and that the authors should not generally have given greater attention to this point. The book is unfortunately bulky, and the absence of illustrations is a decided defect.

The remarks already made on the treatment of theoretical subjects will also apply in the case of this work. Equivalents, atoms, and chemical affinity, are at once introduced by definitions, and in the far too brief notice of the atomic theory we find this remarkable passage.

" We should wish the mind of the student to be impressed with the fact, that the atomic theory is merely a collection of laws based upon a pure assumption of the finite divisibility of matter, thus widely differing from the doctrine of equivalents, which is really the result of experiment and the generalization of facts."

Now any theory, based upon any assumption, relating to matter, would be utterly valueless, and laws it certainly could not give, unless perhaps it were a law of mental aberration.

Quite different is the case with regard to the atomic theory and the doctrine of equivalents which have been, and still are, the very life and soul of Chemistry. The latter is simply the systematized statement of the results of experience ; or, in other words, laws of chemical phenomena. It is upon this that the atomic theory is based, and not upon any assumption of the finite divisibility of matter, which is merely an axiom of the atomic theory—not indeed as a pure assumption, but an inference from observed facts on grounds of probability ; and recognized partly on this account, and partly for the sake of convenience.

BOOKS RECEIVED.

Memoirs of the Life and Researches of John Dalton, Hon. D.C.L., Oxford ; LL.D., Edinburgh ; F.R.S., &c. &c. By William Charles Henry, M.D., F.R.S., &c. London : printed for the Cavendish Society, by Harrison and Sons, St. Martin's Lane. 8vo, pp. 249. 1854.

The Half-Yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., Cantab., and C. B. Radcliffe, M.D., Lond., L.R.C.P., &c. Vol. xix., January—June, 1854. London : John Churchill, New Burlington Street ; Edinburgh: Maclachlan and Co.; Dublin: Fannin and Co.

REPORT ON THE COAL GAS SUPPLIED TO THE CITY OF LONDON; *with Examples of the Injury done to Books, &c. by the Products of its Combustion.* By HENRY LETHEBY, M.D., Professor of Chemistry and Toxicology in the London Hospital. Addressed to the Commissioners of Sewers of the City of London. E. Dawson, Printer, 148½, Fenchurch Street, City. 1854.

PROCEEDINGS OF THE ROYAL SOCIETY. Nos. 1, 2, 3, and 4.

THE CHEMISTRY OF POISONS (a Chart), *a Concise Arrangement of the most Deadly Mineral, Metallic, and Vegetable Preparations, exhibiting at one view the Appropriate Tests, in Qualitative Analysis, accurately coloured, designed for the use of Medical Men and Chemists.* By JOHN HORSLEY, Analytical Chemist, Cheltenham. Third edition.

EPITAPHIUM.

Here lieth to Digest, Macerate, and Amalgamate with Clay
In Balneo Arenæ
Stratum super Stratum
The Residuum, Terra Damnata, and Caput Mortuum
of BOYLE GODFREY, Chemist
and M.D.
A Man, who in this Earthly Laboratory
Pursued various processes to obtain
Arcanum Vitæ,
or the Secret to Live;
also, Aurum Vitæ,
Or the Art of getting, rather than making Gold.
Alchemist; like
all his Labour and Projection
as Mercury in the Fire, Evaporated in Fumo,
When he dissolved to His first Principles
He departed as poor
as the last Drops of an Alembic;
For Riches are not poured
on the Adepts of this World.
Though fond of News, he carefully avoided
The Fermentation, Effervescence,
and Decrepitation of this Life.
Full Seventy Years His exalted Essence
Was Hermetically sealed in its Terrene Matrass;
But the Radical Moisture being Exhausted,
The Elixir Vitæ Spirit
Had exsiccated to a Cuticle.
He could not suspend longer in His Vehicle,
But Precipitated Gradatim
Per Campanam
To His original Dust.
May that Light brighter than Bolognian Phosphorus preserve Him
From the Athanor, Empyreuma, and Reverberatory Furnace of
The other World,
Depurate Him from the Fæces and Scoria of this,
Highly Rectify and Volatilize
His Ethereal Spirit,
Bring it over the Helm of the Retort of this Globe,
Place it in a proper Recipient
Or Chrystalline Orb
Among the Elect of the Flowers of Benjamin,
Never to be Saturated
Till the General Resuscitation,
Deflagration, and Calcination
And Sublimation
Of All Things.

Campana, a bell; in former Chemistry, a receiver in which gas was concentrated and condensed into a fluid. Thus, Sulphuric Acid was described as Oleum Sulphuris per Campanam.
Athanor, a digesting furnace used by the old Chemists.

TO CORRESPONDENTS.

We have received a letter from Messrs. Prichard and Collette, containing strictures on the remarks in our last number on the proceedings against the Society, some portion of which Messrs. P. and C. say they cannot understand. At this we are not surprised, as our remarks were addressed to the common sense of our readers, and had no pretensions to legal sophistry. The substance of Messrs. Prichard and Collette's letter is to the effect that they repudiate all admissions, and have made none, and that they are instructed to pursue their hostile and obstructive proceedings against the Society by every means that legal ingenuity can supply.

A Pharmaceutist (London) has been misinformed.

M. P. S. (Bradford.)—The House of Commons would not sanction the restrictions on grocers and other persons in regard to the sale of drugs, as suggested by M.P.S.

A Registered Apprentice (Bury St. Edmond's.)—(1.) Cannot be admitted an Associate of the Society without passing the examination.—(2.) The price of Neligan's "*Medicines, their Uses and Administration*," is 15*s*.

T. R. (Liverpool.)—Suggests as a means of preventing Accidents from Poisoning, that the labels of lotions or other poisonous applications be pasted on the lower part of the bottle, and those of medicines for internal use on the upper part. This plan, like many others, would be ineffectual because it would not be universally adopted. We think the best security against such accidents is the use of plain English labels, well written or printed in all cases, and when "For external application," an additional label, containing those words, or the words "Not to be taken." If these precautions were always used, accidents could scarcely occur except by culpable carelessness on the part of patients or nurses.

Amator Libertatis.—The letter being anonymous, and not being one which we could adopt in all respects was omitted. The author will find the subject treated at some length in this number.

J. J., M. P. S. (Peterchurch).—(1.) It is not the province of the Pharmaceutical Chemist to visit patients : on a sudden emergency he might use his endeavours to afford relief until the arrival of a medical man. (2.) He could not legally charge for attendance. (3.) The label enclosed makes the medicine liable to stamp duty.

A. P. S. (Plymouth).—The statement being *exparte* and not authenticated with the name of the author we can offer no opinion.

C. H. (Hereford).—The direction is not very legible, but we conclude that it means a teaspoonful to be taken at bedtime. Cochl. i. min. h. s. s.

M. P. S. (Manchester).—*Bain des Bareges*, see vol. xiii., page 607.

J. R. J. (Cardigan).—(1.) We are unable to give the information. (2.) Chemists are not exempt from serving on juries.

J. W. K. (Manchester).—*Conversion of Starch into Sugar.* The following proportions may be used :—Fifteen parts of starch, sixty parts water, and six parts sulphuric acid ; neutralize with chalk. See any work on Chemistry.

Q.—*Spiritus Ammoniæ Succinatus.* The *Tinctura Ammoniæ Comp.* of the present Pharmacopœia with the addition of four minims of oil of amber.

S. Thompson (York).—The Classical Examination. For particulars apply to the Secretary, 17, Bloomsbury Square.

A Student.—Yes; or Lindley's *Vegetable Kingdom.*

P.—By the application of heat, and stirring the mixture till cold.

I. S. We do not know where Borden's Meat Biscuits are sold.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. III.—SEPTEMBER 1st, 1854.

THE PHARMACOPŒIA COMMITTEE.

The Resolutions published in the Transactions of the Society (page 107) will furnish our readers with some information as to the mode in which it is proposed to conduct the proceedings of this Committee. Some further explanation, however, may be desirable, as the subject is one in which the entire medical profession are interested, and in which the co-operation of Pharmaceutists is invited.

It was the primary object of the Council to constitute the Committee on a broad basis in order to extend the sphere of its usefulness. Accordingly the Council was resolved into a Pharmacopœia Committee, with power to obtain assistance from such Members of the Society as may be disposed to promote its objects; and as so large a Committee, comprising Members who reside at a distance, could not be expected to hold frequent meetings, it was thought expedient to appoint a sub-Committee, on whom the labour should chiefly devolve. The general Committee will be summoned when occasion requires, to receive reports of the investigations of the working Committee on subjects referred to them by the Pharmacopœia Committee of the College of Physicians, or introduced to their notice from other sources. There are two modes by which the object in view will be promoted. First. In revising the several sections of the Pharmacopœia, the Committee of the College will submit for the consideration of the Committee of the Society the proposed additions, omissions, or other alterations. Secondly. The Committee of the Society will originate or receive from other Members suggestions with regard to such Pharmaceutical improvements as may appear to them to be deserving of the attention of the College.

When questions arise on which it may be desirable to collect information from various sources, the Committee of the Society will communicate with the Members either by circular or by a notice in the Transactions. The answers to such inquiries will, in all probability, contain the requisite information with regard to remedies or preparations which may be in common use in some localities, although not generally known and appreciated, and also with regard to inconvenience arising from defects in recognized formulæ, and from the existing discrepancy between preparations bearing the same name in the three Pharmacopœias, but differing in strength or composition. This latter evil is one which has been so often pointed out, and some of the instances in which it occurs are so glaring, that an official discussion of the subject by the two Committees in England must of necessity lead to some communication between the three Colleges; and as the Pharmacopœia Committee of the Society represents North as well as South Britain, this will pave the way for the ultimate amalgamation of the three Pharmacopœias. We need only refer to the solutions of morphia, which differ in strength fifty per cent., involving the liability of a patient taking *half* the dose, *or twice* the dose intended if the prescription be written in one part of the United Kingdom and prepared in another. To allow such a liability to continue in the case of a preparation of which a double dose *might* produce fatal consequences, would indicate a culpable disregard of human life. In other instances the discrepancy, although less serious, occasions much perplexity to the dispenser, and sometimes causes him to be unjustly accused of inaccuracy, when the evil arises from the practice of assigning the same name to two different preparations. When compound colocynth pill is ordered, which of the three preparations should be used? This depends upon where the prescription happens to have been written.

Several subjects which will come under the notice of the Committees have already been discussed in conversation, and we have no doubt that the co-

operation of the Medical and Pharmaceutical bodies in these investigations will lead to a considerable improvement in many of those details in which the practical experience of the dispenser is required. For example, in the last London Pharmacopœia soft soap is ordered instead of hard. This is an improvement in some preparations, but if the authors of the Pharmacopœia had been in the habit of making the pill masses they would not have ordered soft soap to the exclusion of hard in cases where the result has the consistence of an electuary instead of that of a pill mass. Such oversights are excusable, and readily accounted for in a work of this nature, the authors of which have not themselves practised the manipulations they describe; and we advert to them at the present time merely for the purpose of showing the distinction between the functions of the two Committees, and the responsibility which will henceforth rest on the Pharmaceutical Society in reference to the above matters. The Committee of the Society will not interfere with the prerogative of the College of Physicians, by whom and on whose authority the work will be issued; but that Committee, as the organ of the Society, having been officially consulted, will be held responsible for any pharmaceutical defects or omissions which they may have failed to point out.

It is therefore incumbent on the Members of the Society, individually as well as collectively, to assist in advancing the art and science of Pharmacy by contributing to the general store of information such additions as their practical experience may enable them to furnish. The subjects which will claim the attention of the Pharmacopœia Committees will supply materials for discussion at the Pharmaceutical Meetings, which, if kept up with spirit, and well attended by the Members, will become increasingly important and useful. The presence of members of the medical profession at these meetings, and the discussion of such subjects alike interesting to the prescriber and the dispenser, will be likely to elicit information on both sides, and lead to a practically beneficial result.

THE SCHOOL OF PHARMACY—SESSION 1854-5.

The arrangements for the ensuing session having been referred as usual to the Library and Museum Committee, which met on August the 17th, a resolution was unanimously passed recommending a renewal of the lectures as before, to commence with the month of October. As this recommendation requires the confirmation of the Council, which will not meet until the 6th of September, the official announcement with the programme will not appear in the Transactions of the Society until a few days before the opening of the session. We are, however, authorised by the President and Committee to state in general terms that these arrangements are in contemplation, in order that Students may be prepared to join the classes at the commencement.

The education at the School of Pharmacy comprises a course of Lectures on Chemistry and Pharmacy, by Mr. Redwood; a course on Botany and the Natural History of Drugs, by Mr. Bentley; and Practical Instruction in Synthetical and Analytical Chemistry in the Laboratory of the Society, under the superintendence of Mr. Redwood.

Since the decease of Dr. Pereira the course of lectures on Materia Medica has been discontinued, and some instruction in the natural history of drugs has been comprised in the lectures on Botany, not as a substitute for the other course, but for the purpose of connecting the science of botany with the purposes for which the Pharmaceutist requires it, and to lead the Student into the elementary part of the study of Materia Medica. It is much to be regretted that the loss the profession has sustained by the decease of Dr. Pereira has not been, and is not likely to be, supplied; but it is not forgotten that even during the connexion of that eminent Professor with the School the

lectures were not so well attended as they ought to have been. This circumstance has induced the Council to defer the appointment of a Professor of Materia Medica, and to confine the lectures for the present to the two courses above mentioned.

The subject has on several occasions been considered, and we hope the time will come when the Students who are destined to become the successors of the present race of Pharmaceutical Chemists will, by their alacrity in the prosecution of their studies, justify the enlargement of the curriculum in the School of Pharmacy, and the revival of the course of lectures on Materia Medica.

The expense of the School is of secondary importance when we consider the purpose for which it was founded and the influence of education on the future character, position, and commercial prosperity of the Pharmaceutical body. But if any additional expense is to be incurred for improving the course of instruction, it must be under the assurance that those for whose benefit the School is carried on will avail themselves of the opportunities afforded.

A more numerous and regular attendance might be taken as a favourable indication, and induce the Council to re-model and extend the courses of lectures. We may remind Apprentices and Students, that unless they exert themselves during the period allotted to the completion of their education, they will have cause to regret their negligence when they present themselves for examination. It is optional with each individual where and in what manner he obtains his qualification. By dint of much application and labour during a course of private study it is *possible* to acquire a sound education, but by the aid of lectures, and practical instruction in the laboratory, the task becomes comparatively easy, and a higher degree of proficiency may be attained.

The month of September is usually occupied in recruiting the health and enjoying recreation in the country. During that month the schools are closed, and preparations made for the ensuing session. The commencement of October is the time for resuming active operations in the laboratory and lecture-room. The lectures are free to Members and Associates of the Society, and although there are some persons who fancy that anything which is not paid for is of no value, those who have a due regard for their future success in their profession are not likely to labour under this delusion. We have before us a noble example in the Royal Academy of Arts, in which upwards of £1000 is expended annually in the maintenance of a school which is free to all students eligible for admission. The conditions of eligibility are evidence of talent and industry, with a recommendation from any person who from personal knowledge of the candidate affords grounds for believing that the advantages will be duly appreciated. To the beneficial influence of this school may be attributed much of the improvement which has taken place in the fine arts in this country, by the development of native talent wherever it is found to exist, and the increasing patronage which naturally follows as the reward of merit. In the Pharmaceutical profession similar results are attainable, for in proportion as the Members of that body elevate themselves by mental cultivation and scientific attainments, their services will be more valued, and remunerated accordingly.

THE CHOLERA.

"Various, contradictory, and often violent as have been the arguments and discussions carried on relative to the mode of propagation and pathology of cholera, the battle-ground has been still more hotly contested in respect to its therapeutics." —*Lancet, Aug.* 19.

The prevalence of diarrhœa and cholera at the present time has revived the controversy referred to in the above quotation, but it does not appear that experience has added much to the incongruous list of remedies and modes of treatment. Opiate confection, chalk mixture, aromatic confection, tincture of

catichu, and aromatic rhubarb draughts are much in demand. The instructions of the College of Physicians, issued in October, 1853,* and the regulations published in the *London Gazette*, October, 1848, sanction the use of this class of medicines, as in cases of ordinary diarrhœa, coupled with the recommendation to obtain medical advice with the least possible delay in case of an attack. In this latter recommendation we fully concur; nevertheless it is impossible for Chemists to refuse compliance with the continual demands for remedies either to be kept in the house as a precaution, or to relieve slight symptoms of diarrhœa. On this account we briefly notice a few of the medicines which are in use, among which sulphuric acid has of late been prominently brought forward. It is given in doses of twenty to forty minims, repeated every two or three hours, or oftener if occasion requires. Sometimes half a drachm or a drachm of chloric ether is added to each dose.

Another prescription consists of twenty or thirty minims of laudanum with about double the quantity of sulphuric ether, or the following:—

℞ Chloric Ether, ʒss.
Aromatic Confection, ℈j.
Battley's Liquor Opii, 10 minims.
Sp. Sal Volatile, ʒss. Mix.

Calomel and opium are occasionally ordered in small doses, but more frequently mercury with chalk and Dover's powder, from three to five grains of each, repeated every three or four hours. Sesquicarbonate of soda in half-drachm doses has been recommended as efficacious in some cases. The comparative merits of acids and alkalies, sedatives and stimulants, laxatives and astringents, we do not pretend to discuss. The above examples with those which we have given in former numbers are sufficient to show the nature and variety of the remedies adopted by different practitioners. We occasionally hear of specifics which are said to cure Asiatic cholera in two hours; but such statements, unless supported by satisfactory evidence (which they never are), we pass over as fabulous.

PARIS UNIVERSAL EXHIBITION OF 1855.

The quinquenial Exhibition in Paris, which, in due course, had been appointed for the 1st of May, 1855, will, on that occasion, be united to a universal exhibition of agricultural and manufacturing products.

Hitherto the Exhibition in Paris has been entirely *national*. It was, as its name implied, an exhibition of the products of French industry. Its object was to raise the character, stimulate the energies, and display the productive talents and ingenuity of the French people. Visitors from all nations were invited to inspect, but not admitted to competition.

The English Exhibition of 1851 was undertaken on a more extended scale; the competition was thrown open to the whole world; and all nations were invited to come forward on equal terms to show what they could produce, and obtain the credit they respectively deserved. The French nation is about to follow this example, and we may expect that the Exhibition of 1855 will far exceed in extent and importance any of its predecessors. The French have no reason to fear competition or comparison with other nations in the products of their industry. In some departments they stand pre-eminent, and in others,

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* "No degree of looseness of the bowels should be neglected for a single hour. Medical advice should be at once sought when the looseness begins; and, previous to the arrival of a medical attendant, some of the medicines at other times used for checking diarrhœa should be taken—for example, the chalk mixture; the compound cinnamon powder; or the compound chalk powder with opium, in doses of from twenty to forty grains for an adult.

"No saline aperients or drastic purgatives should be taken without the advice of a medical man."—*The College of Physicians on Cholera.*

although they have to contend with formidable rivals, the trial of skill tends to stimulate, and gives fresh scope for inventive talent.

There is also a great advantage in this interchange of communication between different nations on scientific and commercial subjects. It establishes a mutual dependence on each other—a community of interests—which, while it encourages industry, promotes harmony and peace. The unfortunate occurrence of a war at the present time, resulting from the rapacity and obstinacy of one man, has placed Europe under a temporary cloud, and retarded the accomplishment of the result which may be anticipated from this kind of intercourse between nations. But it is not on this account less necessary to persevere in a policy from which much benefit has already arisen, and which, if allowed to take its course, will gradually form a bond of union between the nations of Europe founded on commercial relations and the cultivation of the arts of peace.

The British Government has voted £50,000 to defray the expense of carriage to and from the Exhibition in Paris, and Committees are appointed in the several departments of industry to make the needful arrangements with exhibitors. A summary of the regulations will be found in another part of this number, from which it will be seen that all communications between exhibitors and the French Commission must take place through the medium of the official channels appointed in each country. The total amount of space is 900,000 superficial feet, of which 150,000 have been allotted to Great Britain, including the Colonies. The apportionment among the different sections has not yet taken place.

In the month of July a Committee was appointed to represent Chemical and Pharmaceutical Products.* It will be observed that according to the published regulations (of which we did not receive a copy until the 11th of August), applications for space should have been sent in not later than the 1st of that month. At a meeting of the Committee, held on the 11th of August, the total amount of space applied for was estimated, as it was necessary on the following day to send the final answer to the Commission in Paris. The Committee considered that sufficient publicity had not been given to the arrangements, and that in all probability many persons who might be desirous of sending objects to the Exhibition had not had the opportunity of making the requisite application for space within the time specified in the conditions. Accordingly it was decided that the space applied for by the Committee should be rather in excess of that which had up to that time been demanded by exhibitors, and that applications should be received UNTIL THE 15TH OF SEPTEMBER, about which time the Committee will meet to complete their final report as to the space to be allotted to each exhibitor. It was also arranged that this decision, with the other regulations, should be notified in the Pharmaceutical Journal, in order that the information should be generally circulated among those who might be desirous of exhibiting Chemical and Pharmaceutical Products. If the space applied for on or before the 15th proximo should exceed that at the disposal of the Committee, the quantity allotted will be apportioned accordingly, and an answer will be sent to each exhibitor stating the number of feet reserved for him. It must be understood that the above is a private arrangement, made by the London Committee on Chemical and Pharmaceutical Products on behalf of exhibitors in London and the neighbourhood. Similar regulations are in force in other localities. It is at present uncertain to what extent the demands for space will be met; but we have been informed that the applications from the makers of agricultural implements would, if complied with, absorb the accommodation of the entire building. The demand from the coachmakers has also been extensive, but in the Chemical and Pharmaceutical department the number of applicants up to the present time is comparatively small, and their demands moderate.

* Consisting of Messrs. Squire, Morson, Redwood, Davenport, Bullock, and Bell.

It is desirable that Chemistry and Pharmacy should be properly represented in the Exhibition, and those who may wish to take a part in the undertaking should communicate without delay by letter, addressed to

"The Committee on Chemical Products, &c., Paris Exhibition."

"To the care of

"Captain Owen,

"Marlborough House, London."

Exhibitors will be allowed, if they think proper, to quote the price at which they can supply the products exhibited; as the competition has reference both to quality and economy in the manufacture. The emulation thus invited is calculated to encourage commercial enterprise as well as professional and mechanical skill. A periodical exhibition, conducted with these objects, is worthy of general support, and must not be placed on a level with the Crystal Palace at Sydenham, which has been degraded into a bazaar and licensed beer-shop.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

MEETING AT LIVERPOOL.

The next meeting of this Association is appointed to take place at St. George's Hall, Liverpool, on Wednesday, the 20th of September, on the evening of which day, at eight P.M. the President, the Earl of Harrowby, will deliver the introductory address.

Among the local attractions in the vicinity of Liverpool, are the Salt Mines of Northwich; Conway; Bangor; the Slate Quarries at Llandegai; the Britannia Bridge; the Harbour Works at Holyhead; the Paris Copper Mine in Anglesea; also the Glass Manufactories, Chemical Works, and Coal Mines, near St. Helens.

The public buildings and other objects of interest in the City of Liverpool are too numerous to be mentioned here, and every facility will be given to Members of the Association for obtaining admission to the public buildings, manufactories, &c. The Railway Companies, and the City of Dublin Steam Packet Company, will promote easy transit by reducing the fares, and several excursions are in contemplation, combining scientific interest with agreeable recreation.

Having on a former occasion attended a Meeting of the Association at Liverpool, we can bear testimony to the great liberality, public spirit, and hospitality with which the arrangements are made, with a view of placing within reach of visitors the numerous objects of attraction with which that city abounds.

Professor Owen will deliver a Lecture on Anthropomorphous Apes, and Colonel Sabine on Terrestrial Magnetism. The Fausset collection of Anglo-Saxon antiquities will be exhibited, and an explanatory Lecture will be delivered by Mr. Wright. A projection of the moon's surface, fifty feet in diameter, will be exhibited by the Photographic Society, and a Vivarium is in course of completion, containing an extensive collection of aquatic animals to be found on the neighbouring coast.

Papers will be read, and specimens exhibited as usual, in the several sections; the particulars of which, even if we had received them, would have been out of place in this Journal. But we have been requested to state that Dr. Edwards, of 42, Berry Street, will be glad to receive contributions for the Chemical and Pharmaceutical section, which is the one to which we desire to invite the attention of our readers.

LATE HOURS OF BUSINESS.

We received the report of the second five o'clock meeting at the Freemasons' Tavern too late for insertion, and our space would only admit of an abstract. This, however, contains the pith of the report, the portions omitted being chiefly a repetition of arguments and remarks previously advanced. Some of the speakers take exception to the qualified encouragement which we gave to the movement in our last number, and comment upon the fact that the subject had not been taken up officially by the Society, or advocated in this Journal many years ago. Our reason for previously abstaining from it was, that we have always observed the subject to be of a combustible nature, and the attempt to attain the object desired *in the manner hitherto tried*, has ended in disappointment, and in coolness if not personal hostility between individuals. It is a mistake to say that the Chemists have never exerted themselves to promote early closing. Before the establishment of the Pharmaceutical Society, and on more than one occasion subsequently, the question has been agitated; but it has generally been the prelude to personal reproaches and recrimination between the parties concerned, each accusing his neighbour of departing from the terms of the agreement, and assigning this as a reason for doing the same himself. Observing this tendency, we arrived at the conviction that such a movement would be more likely to drag the Society, *if identified with it*, into the meshes of jealousy and discord, than to promote the primary object with which it was formed—namely, the union of the Chemists and Druggists of this country into one body. Our exertions have for many years been devoted to the endeavour to effect this union, and we therefore advisedly avoided subjects which addressed themselves directly to the prevailing frailty of human nature, such, for example, as the attempt to control or interfere with the private business arrangements of individuals.

The stability and permanence of the Society being now secured by Act of Parliament, and its present position being founded on improved education, this circumstance may serve as a lever to aid the promoters of early closing in the object they have in view, and in which we desire to co-operate. But in so doing, we think it right to caution our friends against the imprudence of going too fast and falling into the errors which on previous occasions have led to failure. It is a fatal mistake to hold out expectations which are not likely to be realized; and while we hope and believe that some improvement will be effected, we are persuaded that the conditions which we suggested last month are necessary to ensure success. We have also lived long enough to know that however successful may be the movement, the result will not be satisfactory to all parties. The Assistants in the wholesale houses, whose labours terminate at seven, on Saturday at six, and whose Sunday is a day of rest, are not satisfied. They consider a half-holiday on Saturday essential to their health and comfort. The Retail Assistants would be thankful to enjoy the wholesale privileges, even without the half-holiday. Mr. Lilwall tells them to be satisfied with nothing less than closing at eight. We strongly advise them to take whatever is offered, for most assuredly if they insist upon "eight o'clock or nothing," many of them may expect to remain in *statu quo*. Mr. Lilwall is a zealous and talented advocate, and we fully appreciate his services, but his enthusiasm not being kept in check by practical experience in the business of a Pharmaceutist, might possibly mislead some of our readers, unless moderated by a reference to plain matters of fact. We have received several letters from Assistants containing very strong language—appeals to *fellow-sufferers to break the bonds*—to *emancipate* themselves from *slavery*—with other expressions, the publication of which would do injury to the cause. In the pamphlet about to be issued, intemperate remarks and a dictatorial tone should be carefully avoided. The

plain unvarnished truth is strong enough, and much more convincing when divested of caustic adjectives and overdrawn comparisons. The letter of Mr. Charles Taylor, in another part of this number, possesses this merit. It is a well-expressed and temperate appeal to common sense, and such appeals ought not to be disregarded.

In making these remarks it must not be supposed that we wish to discourage, or in any way retard, the accomplishment of the desired reform in the hours of business. Our object is to point out the danger of injuring a good cause by an injudicious mode of proceeding, and we believe the success of the movement will depend upon the manner in which it is conducted. The proposed pamphlet, the meetings, and the appeal to individuals, will give publicity to the facts of the case, and by the united efforts of Principals, Assistants, and the Public, a good result may be anticipated. We believe that in many localities it may be found practicable and advantageous to all parties to close at eight o'clock; but those who disregard the local circumstances of particular districts, and expect to see the same rule observed in streets which are scenes of bustle and activity until eleven or twelve at night, will be disappointed. No less fallacious would be the hope that all who close their shops at eight will shut the door against their customers at the same hour, without regard to the nature and requirements of their business; for we know that in some dispensing establishments, at certain periods of the year, the pressure of business is greater between eight and nine (sometimes until after ten) in the evening, than it is in the middle of the day.

MEDICINE STAMP AND LICENCE ACTS.

The payment for Medicine Licence becomes due on the 1st September, and if not paid before the 1st of October, the penalty of £20 is likely to be enforced in the case of the sale of any patent or proprietary medicine requiring a stamp.

We have received several letters from correspondents stating that "common informers" are active in some localities, especially Newcastle-on-Tyne. This is a mistake; as no common informer is listened to, or in any way concerned in the matter.

The persons who lay informations are officers of the Inland Revenue, officially deputed by the authorities at Somerset House to visit the shops in various localities for the purpose of ascertaining whether the law is observed or not.

We have used all our endeavours to guard against this annoyance by publishing cautions and explaining the state of the law; but in spite of all that has been published, the cautions are forgotten, the epidemic occasionally breaks out, and penalties are the result. We can add nothing to the information already published on the subject, Vol. xii., No. 11, page 506, where the conditions requiring medicines to be stamped are concisely stated, with references to previous articles in this Journal.

The following letter from the Secretary also reiterates the same facts, and shows the necessity of attention to the subject:—

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

17, *Bloomsbury Square*, *August* 23, 1854.

Mr. Editor,—I find that the agents of the Board of Inland Revenue have renewed their foray against the Chemists and Druggists in various counties, as I have received several communications from Members of the Pharmaceutical Society, informing me that they had received notices, threatening them with proceedings, for recovery of penalties incurred, by evident, but unintentional breaches of the Stamp Act.

I am aware that you have at various times drawn the attention of your readers to the requirements of this Act, but without effectually preventing the violation of it. I am aware, also, that the offence arises from the use of the forms adopted by the public printers of shop labels, but I would suggest that you should place amongst

the "Answers to Correspondents" a *standing notice* to the following effect, to meet this frequent and wide spread annoyance.

"The interpretation of the Stamp Act, as applied to the sale of medical preparations.—The *intention* of this Act involves *all* medical preparations put up for sale with recommendatory labels or papers, referring in any manner to any ailment or disease, or *implying* that it is 'prepared by the vendor only.'

"The exceptions allowed by the interpreters of the Act, permit the use of

"The name of the article, the dose, the name and address of the maker or vendor.

"Any allusion to any ailment or disease, or the statement that the article is 'prepared by' the maker, is interpreted into its being a *secret* preparation, and renders it justly liable to the object and intention of the Act."

I have the honour to remain, your obedient Servant,

GEO. W. SMITH, *Secretary.*

DUTIES AND RESPONSIBILITIES OF THE PHARMACEUTICAL PROFESSION.

BY MR. R. W. GILES.

"It is a grievous fact that in the 19th century we have no Governmental Chemists, for the want of which the practice of medicine in our worst malaria is a fallacy. Those who could render the greatest services to mankind, by working out what many a thinking man can dictate, are the drudges of trade, and possess neither the time, apparatus, nor pecuniary means for making those investigations which are imperative to health."—*Extract from letter in* TIMES, *August 17th, signed "Lex Naturæ," referring to theory of Cholera.*

THE above extract from a letter in yesterday's *Times* seems a fit peg whereon to hang a moral. The writer clearly refers to the Chemists and Druggists in the expression "the drudges of trade," wanting time, apparatus, and means for necessary hygienic investigations.

It is not for the purpose of complaining of these depreciating terms that I would call further attention to them, for unhappily they have too much foundation in fact, and they do not appear to be unkindly, but rather sympathisingly, used. It is with the disabilities of our circumstances, and not the neglect of means at our disposal, that the writer quarrels; and the very just tenor of his letter, so far as it concerns us, is, that there does not exist in connexion with the Medical Profession a body of Chemists capable of carrying out the Chemical department of hygienic investigation. It is not a new fact which is thus stated, but it is a good telling illustration of the truth that Pharmacy ought to occupy a much more honourable and scientific relation to the practice of Medicine than it has hitherto done. It offers a field sufficiently extensive and dignified for the most comprehensive minds, and did it hold the position to which it is intrinsically entitled, it would be properly and popularly esteemed, equally with any other of the learned professions, the index of scientific attainments, liberal education, and enlarged views. Can it be doubted that the pursuits which led Dr. Pereira to such well-deserved honor are in themselves sufficiently elevated for an honourable professional career? For it must be remembered that Dr. Pereira achieved his reputation especially by his researches upon the natural history of drugs, and that it was therefore mainly by undertaking the unfulfilled duties of the Pharmaceutist, as recorded in his laborious compilation *The Elements of Materia Medica*, that he has left a name which will never be forgotten. It is evident, therefore, that Pharmacy, which has hitherto never in this country risen above the level of a petty trade, is capable of much more lofty things; but whether it shall continue in the same plight, or ultimately lift itself among the professions, depends not upon the hocus-pocus of Acts of Parliament, but upon the character of those who practise it. The elements of better things are in our hands—we have a scientific curriculum with compulsory examinations already established,

all that is necessary for the technical construction of a profession. Time will show whether we are sufficiently large-minded to build with these materials. But is difficult to break through the "drudgery" which a degraded position of Pharmacy entails upon all who enter upon it, and it is chiefly to encourage those whose hearts may faint at the slow progress we seem to make, that I propose to show that this tardiness is an inevitable characteristic, and not, therefore, an unsatisfactory indication. There were some who seemed to anticipate that an Act of Parliament would at once place Pharmacy on a par with the professions, and that its omnipotent provisions would prove a panacea for all the grievances under which the trade had formerly groaned; and these, at first unwisely sanguine, are now inclined to rush to the opposite extreme of despondence and denounce all that has been gained as idle and ineffective. "*In medias res*," &c. Those who did not expect so much at first, see no reason now to doubt of ultimately attaining all that they ever did look for.

The Pharmacy Act has rendered an Examination compulsory; it therefore ensures that every future Pharmaceutist shall have a certain knowledge of Botany, Chemistry, and their application to Materia Medica. Is that no step in advance? Is the difference that such legislation establishes between the true and pseudo Chemist and Druggist one of name only? Or is it likely that a body by whom so much scientific knowledge is universally possessed, can fail to make a proportionate impression upon public opinion? At the present time, the Members who possess this qualification still feel themselves restrained by the hereditary "drudgery" of the trade from prosecuting those departments of science to which they are most inclined, but we may reasonably expect in the gradual assimilation of Pharmacy to the professions, that the term of apprenticeship will at first become considerably modified, and that other opportunities will be provided as the necessity for them becomes apparent, until those means of scientific pursuit which are now possessed by the few, will ultimately become the privilege of all, and we may hope to find Pharmacy contributing its contingent of illustrious botanists, chemists, and geologists, who will not need to blush for the estimation with which their ordinary avocations are regarded.

The growing taste for photography, the frequent opportunities for analytical examinations—of urinary deposits for example—the delivery of lectures, either occasional or as a course at public institutions, and the numerous applications which visitors in country districts are accustomed to make to Pharmaceutists for information upon the botanical and geological peculiarities of the neighbourhood, offer so many opportunities for him to manifest his knowledge, and procures precisely that kind of consideration which is characteristic of professional intercourse, and should distinguish us from *mere* tradesmen. If we have not this scientific qualification, we must remain at the old level, for no external pressure will elevate a man in an intellectual scale.

"Who would be free, himself must strike the blow,"

is a sublime truth, capable of a good many oblique applications in social life.

As opportunities are provided, I doubt not the zeal of the rising generation to use them well. Let them under an improving régime become distinguished for their attainments, and they will infallibly raise their occupation to the dignity of a profession; there is no such certain passport to honour as scientific reputation; and it possesses this peculiarity, that the smallness of a man's origin is an addition to his merit; let but this distinction be achieved, and, *malgre* the white apron and the shop (which last, however, should be more of a Pharmacy and less of a bazaar than the present custom tolerates), the highest title to professional character has been gained, and the world will not be slow to endorse it.

Clifton, August 18, 1854.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *August* 2.

The Confirmation and Approval of the Bye-laws, by Lord Palmerston was laid before the Council as follows:—

"I hereby certify my confirmation and approval of the annexed Bye-laws of the Pharmaceutical Society, with an amendment therein confirmed and approved at a Special General Meeting of the Society on the 18th of May, 1854, for the space of one year from the 17th June last, and subject to the decision of a court of law upon the legal questions which have arisen, or may arise, in reference to any of them.

"*Whitehall, July*, 1854." "Palmerston.

THE PHARMACOPŒIA COMMITTEE.

The Report of the Library and Museum Committee was received and adopted, containing the following recommendation:

"That the Pharmacopœia Committee consist of the whole Council, who shall nominate a working or sub-Committee, consisting of not less than seven Members, with power to request assistance from such Members of the Society as may from time to time be disposed to promote the object in view."

AT A MEETING OF THE LIBRARY AND MUSEUM COMMITTEE,
Held on the 17th of August,

The following letter was read:—

"TO THE SECRETARY OF THE PHARMACEUTICAL SOCIETY.

"16, *East India Chambers, Leadenhall Street,*
"*8th August*, 1854.

"Sir,—We have lately received from the west coast of Africa a parcel of Cubebs, the produce of that country. As it is the first importation of the kind from the coast, and hitherto unknown in this country, we imagine a sample may be of interest to the Society. We therefore send you a few, both in their original state and ground, together with a small quantity of essential oil, which Mr. Darby, of Leadenhall Street, has extracted from the berry.

"We are, Sir, yours obediently,
"Fredk. Desnaux and Co."

The sample of pepper and oil which accompanied the letter differs materially from officinal cubebs, although bearing a resemblance in some of the characters. It is known in the drug market under the name of African Cubebs. The subject will be brought under the notice of the next Pharmaceutical Meeting in October.

The arrangements for the School of Pharmacy for the approaching session, having been referred by the Council to the Committee, were duly considered, and a resolution was unanimously adopted recommending a renewal of the Lectures and Laboratory instruction, under the same regulations as those in force last session.

AT A MEETING OF THE PHARMACOPŒIA COMMITTEE,
Held on the 17th of August,

It was resolved,—"That Messrs. Deane, Davenport, Morson, Squire, Hooper, Garden, and Bell, be appointed as the sub-Committee on the Pharmacopœia.

"That the Pharmacopœia be considered in sections, and that the attention of the sub-Committee be directed in the first instance to the section Materia Medica.

"That it be the duty of the sub-Committee to consider and report upon any

proposed alterations referred to them by the Pharmacopœia Committee of the College of Physicians for discussion, and also to collect information respecting drugs and preparations not in the Pharmacopœia which are in use in private practice, and improved processes or formulæ to which it may be desirable to invite the attention of the College."

PROVINCIAL TRANSACTIONS.

CHEMISTS AND DRUGGISTS' INSTITUTE,

Wellington Chambers, Victoria Street, Exchange, Manchester.

The summer course of lectures of this Society has just been brought to a close with a success far beyond the expectations of the most sanguine of its supporters. The difficulties it had to contend with, and the many prejudices to overcome, have happily all been surmounted, and the just objects of the Society so fully appreciated, that the Committee have determined to arrange with the lecturers for a more extended and perfect course of lectures for the winter, and they hope that the very high standing of the lecturers will be a sufficient stimulant to cause those who are not Members of this Society immediately to become Members, and by uniting fresh energy and talent with the present Committee, enable them to proceed with the work of instruction upon a more enlarged scale.

The very high compliment paid by the lecturers to the students of the respective classes for their regularity of attendance and great attention to the instructions offered, must have been as gratifying to the students as pleasing to the Committee. The Examinations took place on Tuesday, the 15th day of August, and the distribution of Prizes on Friday, the 18th, when the following candidates contended for the Prize in

CHEMISTRY.

Lecturer and Examiner, Daniel Stone, Esq., F.C.S., &c.

Name.	Whom with.	Class of Certificate.
*Allen Mercer	Mr. Hammond, Deansgate	1st and Prize
*Josiah Kynaston	Mr. Barker, Greengate	1st
*Edward D. Moorhouse	Mr. Cook, London Road	1st
*Henry Rickwood	Mr. Lynch, Market Street	2nd
*William H. Barlow	Mr. Barlow, Oldham Road	2nd
Peter Toft	Mr. Kershaw, Bridge Street	2nd
William Andrew	Mr. Foxcroft, Chancery Lane	3rd

The Examiner expressed himself highly pleased with the Answers, and placed them in the order given. The gentlemen with an * before their names will have free admission to the Laboratory of Mr. Stone as a further reward.

At the conclusion of the Chemical Examination, the following candidates presented themselves for examination in

MATERIA MEDICA.

Lecturer and Examiner, Alexander Somers, Esq., M.R.C.S. Eng., L.A.S., and Lecturer on Materia Medica at the Chatham Street School of Medicine.

Name.	Whom with.	Class of Certificate.
Edward D. Moorhouse	Mr. Cook, London Road	1st and Prize
Henry Rickwood	Mr. Lynch, Market Street	1st
William H. Barlow	Mr. Barlow, Oldham Road	1st
William Andrew	Mr. Foxcroft, Chancery Lane	2nd
Peter Toft	Mr. Kershaw, Bridge Street	2nd
William Stoker	Messrs. Glasier & Bingleys, Thudehill	2nd

The Examiner placed them in the order named, and declared that he had never been better pleased with the answers of a junior class, and was quite sure, if young men would only support the Society in its endeavours, the next generation of Chemists and Druggists must take a very much higher standing with the medical profession than many at present thought probable. He impressed upon them the necessity of perseverance in their studies, and hoped that parents and guardians would see the necessity of stipulating, before binding a youth as an apprentice, that he should have the opportunity of attending the requisite lectures, &c., to enable him to take his place as a member in a very important branch of the profession.

John Hamer, *Hon. Sec.*

ORIGINAL AND EXTRACTED ARTICLES.

DALTON.

BY MR. JOSEPH INCE.

The story of successful genius is, in nearly every case, the same; either a resolute will, warring with external hindrances, and finally prevailing; or a creative power, turning the common advantages of every day into the stepping-stones of fame; or, as in the case before us, the patient, untiring energy of a thoughtful mind, concentrated throughout life on one great object.

John Dalton was born at Eaglesfield, in Cumberland, where he went to a village school until eleven years old; at twelve he took the lead himself and taught the others, though it seems his lessons were received with little reverence by the pupils, who varied their studies now and then by challenging him to fight. At fifteen he went to Kendal, to assist his brother at an establishment "where youth were carefully instructed in English, Latin, Greek, and French, also writing, arithmetic, merchant's accounts, and mathematics." Here he remained twelve years, relieving his more prosaic duties by answers to the queries of the *Gentleman's and Ladies' Diary*. These were not always strictly scientific, for Mr. William Gradidge asks, "Whether to a generous mind is the conferring or receiving an obligation the greater pleasure?" At this period he became acquainted with Mr. John Gough, a blind philosopher, of whom Dalton says, "There is no branch of natural philosophy but what he is well acquainted with; he knows by the touch, taste, and smell, almost every plant within twenty miles of this place; he can reason with astonishing perspicuity on the construction of the eye, the nature of light and colours, and of the optic glasses." From this rustic sage he learnt Greek and Latin, and though of course they often quarrelled, he was indebted to this intercourse for his first real interest in the pursuits of after life.

Following Gough's example, he commenced his observations on the weather, his first entry being a notice of the Aurora Borealis: he now made a rude barometer, thermometer, and still simpler hygroscope, collected and dried plants, observed the changes of insects and caterpillars, as well as arranged specimens of butterflies. There is a period in every man's life when he becomes disgusted with his present pursuits, and sighs for something better; so Dalton longed to change his school for Law or Medicine. His uncle, however, was accustomed to speak his mind, and thus addressed him:—"As to the two professions of law and physic, if thou wishest to be at the head of one of those professions, that is, to be at the bar, or to be a physician, I think they are both totally out of the reach of a person in thy circumstances. If thou art tired of being a teacher, and wishest to change it for some more lucrative or agreeable employment, and couldst be content instead of becoming a physician or barrister, to move in the humbler sphere of apothecary or attorney, thou mightst be able, with a little capital and great industry, to establish thyself in one of these."

The expected change was never made, for he continued at his old avocations, until he became the Mathematical Tutor of the Dissenting College at Manchester, with which place his name is inseparably connected.

The rest of his life belongs not to narrative, but science. How he commenced his meteorological investigations, including the Theory of Dew, the Force of Steam, and Atmospheric Law in general, wrote an essay on the Vision of Colours, founded on his own peculiar eyesight; a treatise on English Grammar, and the New System of Chemical Philosophy, the result of his numerous studies; how he fell in love, and wrote stanzas to an Æolian lyre; how finally he became a great man, was chosen President of the Literary and Philosophical Society of Manchester, lectured at the Royal Society in London, and went to Court, having in the mean time changed the aspect of modern chemistry by his discovery of the

Atomic Theory; all this, and more, the excellent sketch by Dr. Henry* best discloses.

It was Dalton's misfortune to have been only associated in early life with those whose position and general attainments were inferior to his own. Fortunate is it for most men of genius that their intellect has been the ready passport to the society of those from whose example, as well as discoveries, they have been infinite gainers, without in any way forfeiting their own individual excellence. It is wonderful that Dalton, struggling for an existence as a village schoolmaster, accomplished what he did. As a self-made, self-educated man, he has the highest claim to respect, but his fame would have suffered nothing had he been better acquainted with the views of others, and had his manners caught a little of the refinement of general society. A new world opened before him, when, after having declined an appointment for the Polar Expedition, under the command of Sir John Ross, he was elected a corresponding Member, and subsequently a Foreign Associate of the French Académie des Sciences, in consequence of which he went to Paris. There he was introduced to its various celebrities, including Arago, Humboldt, Cuvier, La Place, and Gay-Lussac. The stranger who has once visited the splendid galleries of the Jardin des Plantes, will share the delight of the unassuming Englishman, as he wandered through a collection which for scientific splendour has no equal in the world.

It is pleasant also to read, that like many another sage, Dalton was charmed with Baron Cuvier's daughter Clémentine, whose exquisite and universal amiability lent a grace to her father's universal fame. "Why is it," asked the wondering damsel in a meditative mood—"why is it everybody loves me?" "I suppose," said the great naturalist, "the reason is, that you love everybody." In these days of over-work and railroads, the following extract, showing how they dine in Paris, may prove a slight relief:—

"At four in the afternoon, by a coach with Dalton to Arcueil, La Place's country seat, to dine. Engaged the carriage to wait for our return at nine. On alighting, we were conducted through a suite of rooms, where, in succession, dinner, dessert, and coffee-tables were set out; and onwards through a large hall, upon a terrace, commanding an extent of gardens and pleasure-grounds. There was a sheet of water in front, and a broad spreading current pouring into it from some rocks, where was seen a sculptured figure—an antique—found in the locality, representing the genius of the place. It is in these grounds that are still remaining the principal Roman works near Paris—the vestiges of Julian's residence, as governor of Gaul. Avenues, parterres, and lawns, terraces, and broad gravel walks, in long vistas of distance, are bounded by woods and by higher grounds. As yet we had seen no one, when part of the company came in view at a distance: a gentleman of advanced years and two young men. Was it possible not to think of the groves of the Academy and the borders of the Ilyssus? We approached this group, when the elderly gentleman took off his hat and advanced to give his hand to Dalton. It was Berthollet! The two younger were La Place's son and the astronomer royal, Arago. Climbing some steps upon a long avenue we saw at a distance La Place walking uncovered with Madame Biot on his arm; and Biot, Fourier, and Courtois, father of the Marchioness La Place. At the front of the house this lady and her grand-daughter met us. At dinner, Dalton on the right hand of Madame La Place, and Berthollet on her left, &c. Conversation on the zodiac of Denderah and Egypt, Berthollet and Fourier having been in Egypt with Napoleon, the different eras of Egyptian sculpture, the fact that so little at Rome—of public buildings—is earlier than Augustus, &c. After dinner again abroad in the beautiful grounds and along the reservoir and aqueduct of Julian. These ancient works, after falling very much into decay, were restored by Mary of Medicis. Dalton walking with La Place on one side and Berthollet on the other I shall never forget. Such men, in their personal attentions, respect in each other the dignity of science itself—the great interpretress of nature and leading star of civilization; something which is

* *Memoirs of the Life and Scientific Researches of John Dalton.* By W. C. Henry, M.D. Printed for the Cavendish Society.

beyond the honoured individual, which yet attends him, impressing a sense of homage that is elevating to him who feels it. La Place is an uncommon union of simplicity of manners and an essential dignity of character. His collected and serene air realizes to the observer the tranquillizing influence of philosophy. We may well conceive that such a man feels for the interest and honour of science something like a religious regard. At the Institute a few days before an instance of behaviour in La Place was a striking exemplification of this remark."

But a little while ago, Manchester, in the midst of its roar of business, beheld a goodly specimen of beautiful old age. A guileless citizen, with not one stray thought beyond Philosophy, was calmly working out his abstract reasonings, heedless of tall factories or sudden wealth. His home was in the laboratory, where he repaired every morning to light the fire and dust the pupils' desks; then, after a frugal breakfast, back again, ready and willing to commence his daily lectures. The spirit of worldly policy was not strong within him, for his instructions were given for the moderate sum of half-a-crown an hour, or eighteenpence when two attended. There sometimes he would busy himself in manufacturing an unfailing remedy for coughs and colds, made with treacle, liquorice, and vinegar, explaining its sovereign virtues to an admiring audience.

No one could be more said to keep the even tenor of his way, for he dined at one, took tea at five, finishing the labours of the day at nine. This patriarchal existence was varied every Thursday by a game at bowls, which he pursued with an amusing ardour; but the main characteristic of the man was that transparent honesty, which made him as scrupulously exacting in his requirements from others as he was upright in his own conduct towards them. Thus he refused a certificate of attendance, until he had repeated in full the missing lecture for the applicant's sole advantage. Such traits of character, as well as his curious aversion to books and general literature, belong to the pleasant recollections of the past. Let us not, however led away by even the prettiness of circumstance, for a moment lose sight of Dalton's real claim to honour, namely, his discoveries in science. A popular sketch necessarily shuts out the exhibition of those careful, minute, deeply-studied investigations, to which all original philosophers owe their reputation.

Those who would wish to penetrate a little beneath the surface, cannot do better than consult the concise, intelligible Essay on the Atomic Theory, by Dr. Henry, given in the middle of the work. As Dalton's claim to priority of thought has been occasionally denied, it is as well to see what were the views entertained on the subject previous to his time, how far he availed himself of the anticipations of others, and to what extent he may be fairly credited with working out for himself the great doctrine on which his life was engaged.

Time was more favourable to Dalton than to another great mathematician, Hutton, who has recorded his opinion in his autobiography that it produces nothing but rags and children. The quiet Friend fared better in his generation: the Royal Society elected him a Fellow, Oxford gave him her honours, Chantrey a statue, and the Government a pension, whilst his countrymen regarded him, even in his lifetime, as a sort of patron saint.

Now that the grave has claimed him he may rest in peace, without the fear of his reputation being snatched away by the spell of the euphonious name of Higgins.

A man who spent the energies of a whole career on the elucidation of one sole object could not be said to have *blundered* on the atomic theory, any more than the enthusiast who should walk on a pilgrimage from here to Manchester could be said to stumble on the high-road.

Self-taught, Dalton succeeded in spite of himself, for his philosophical instruments were of the rudest description, and his hands were not equal to his head; but for original, deep thought, united to a child-like simplicity, he will not soon be forgotten.

Dalton, like Sir Isaac Newton (to whom he bore a strong mental and personal

resemblance), disbelieved in genius, a misconception incident to real greatness, but one most readily pardoned in the case of those whose life is the best refutation of the theory. It is true, indeed, that the marvellous influence of steady perseverance can be alone estimated by those who practice it, yet still there is a barrier which nothing but directing and creative power can pass.

Untiring industry will rescue the dullest mind from mediocrity, but there is an Excelsior which it cannot reach. Many a mountain shepherd has watched the changes of the atmosphere far more than Dalton, but unlike him, in vain; whilst many another inconsequent observer might have viewed the falling of an apple, from the first one that tempted Eve, and been no wiser.

It remains only to congratulate the Cavendish Society on the publication of this interesting memorial of a "Famous Chemist," and we may be allowed to express the united feeling of the Members in conveying our thanks to Dr. Henry for the singularly happy manner in which he has fulfilled his task.

31, *Southampton Street, Covent Garden.*

ON THE HABZELIA ÆTHIOPICA, ETHIOPIAN OR MONKEY PEPPER.

BY W. F. DANIELL, M.D., F.R.G.S.,
Honorary Member of the Pharmaceutical Society.

Among the plants indigenous to equinoctial Africa, are several, which, on account of their reputed efficacy in certain diseases, have been extolled from a remote age, and from their transmission to other countries, have likewise acquired a proportionate celebrity of many centuries' growth. Of these, a considerable number appear to be common to the majority of the inland and maritime regions of West Africa, where they are highly appreciated by the natives for their medicinal virtues, independently of their adaptation to a variety of useful purposes. The product which now claims our consideration, may, therefore, with propriety, be included in this class, since in former years its seeds were vended throughout Europe and in England under the multiform names of *Ethiopian* or *Negro pepper*, *Guinea grains*, *Monkey* and *Guinea pepper*, &c., while the generic term of *Piper Æthiopicum* was that usually employed by the older writers on Materia Medica. As might be expected, great confusion has originated from these irregular designations, the fruit and seeds of plants widely dissimilar having been frequently confounded with one or more of them.

Sufficient grounds for belief exist that this species of pepper was administered as a remedial agent by the ancient Egyptians and other kindred nations at a very primitive date, and probably comprised a portion of the various spices or condiments which the distant kingdoms of Ethiopia furnished as their quota of annual tribute. The earliest record to be discovered concerning it, is in the work entitled الكناش الكبير وصغير (*Al Kinash al Keeber, &c.*) of Serapion, an Arabian physician, who flourished about the middle of the ninth century, and has been considered to be the first treatise on medicine written in the Arabic language. By him and another writer of the same title who lived nearly two centuries later, it was denominated حبّ الزلم *hab.-el-zelim*, or grains of Zelim. The latter thus defines it:—"Hab-zelim, id est; granum zelim. Et est granum pinque, magnitudine ciceris, et est citrinum exterius, album interius et habet bonum saporem, et defertur exterris Barbariæ et nominatur piper nigrorum; verum piper nigrorum secundum veritate est aliud et in Barbaria nominat croni, et est simile phaseolis in forma sua, nisi quia grana ejus et cortex sunt minora phaseolis, et habet colorem nigrum, et saporem acutum

sicut piper et defertur exterris Nigrorum et confert doloribus dentium. Habese. Est calidum in tertio gradu, et humidum in primo, addit in spermate bono augmento, odorem oris facit bonum, et nascitur in locis qui dicuntur Chedensor."* Rhazes has also briefly alluded to its qualities and uses under a similar appellation in one of his numerous works.† Avicenna in his celebrated كتب للقانون في الطب (*Ketab el canoon fil tibb*) or Canons of Medicine, appears equally to have been acquainted with it under the name of حب للزلم although also known by that of حب للزيز (*Hab.-el-zizi*) and states that it is a pepper of good flavour and pungent taste.‡ His Latin annotator remarks that the "granum alzelem est granum, quod apud Venetos appellatur dolcegini et nascunter etiam in Aphrica, (Africa) et alio nomine arabico dicunter Habalzizi."§

During the epoch of these famous physicians, and until the close of the fifteenth century, the Ethiopian pepper was chiefly derived from Egypt, Tripoli, and other kingdoms of Northern Africa, whose markets were scantily supplied with the produce of many of the then unknown countries of Habesh and Soudan, from a commercial intercourse maintained by means of constant kafilas. Owing to the difficulty of attainment and limited quantity, apparently few European practitioners possessed sufficient information relative to its properties, except from the preceding Arabic authorities, and it was not till several centuries subsequent, that the plant was mentioned in any of the publications devoted to botanical subjects. About this medieval period, Matthiolus, Lobel, Bauhin, and other writers, include a short outline of it in their works, the former having furnished a tolerably correct delineation of the fruit, which he observed was known in Italy as *Pepe d'Ethiope*, and found useful in odontalgia. The early English authors, Gerard and Parkinson, both mention this production, and furnish an illustration of the pods under the term of *Piper Æthiopicum*, the former in his "*Herball*," remarking that it was also called *Amomum*, *Vita longa*, and by some *Cardamomum*, of which he deemed them to be a variety.‖ Lamark, in the *Encyclopedie Methodique*, *Botanique*, has also a description of it under the name of *Canang Aromatique*, and states that it was vulgarly called *Poivre d'Ethiopie*, *Maniguette*, &c.¶ Now the latter designation, which in this, as in other instances has been applied to the seeds of the Habzeliæ, has been to many, a fruitful source of error, since *Maniguette* is an African appellation, bestowed specifically on the various kinds of Amoma indigenous to tropical Africa, and not to any other pepper.

Forskal by the term كنبه (*Kænbe*) simply alludes to it among the drugs of the Egyptian Materia Medica at Cairo, as endowed with aphrosidiac virtues, and Browne, in his travels in Darfour, relates that in the country of the Dar Kulla, the قمبه *Kumba*, or Pimento tree, grows in such plenty, "that a *rotal* or pound of salt will purchase four or five mid, each mid about a peck.** Delisle, referring to these travellers, affords no information further than that it was recognised in Egypt by the title of قانبه (*quanbah*) and was procured

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* *Serapion arabis de simplicibus medicinis, &c., ex Arab. reddit, c.* 327, *p.* 323.

† Rhazes filii Zachariæ. *Dictio universalis ad sciendum virtutes nutrientium et Medicinarum, ad c. Otho Brunfelsii*, A.D. 1533, *chap.* xx., *D.*

‡ *In lib.* ii. This book, entitled الكتاب الثاني في الادوية المفردة contains a valuable description of the substances composing the Materia Medica of that and a prior date.

§ *Index Arab. nomine*, 418. *Avicennæ Arabum Medicorum Principis Canon Medicinæ ex Gerardi Gremonensis versione, &c.*, 1608.

‖ *Vide ed. by Johnson*, 1633, *lib.* iii., *p.* 1539.

¶ *Vol.* i., *p.* 596. ** *Flor. Egypt. p.* 164, *No.* 8. *Travels in Africa, ch.* xx., *p.* 355.

from Ethiopia.* In *Rees' Cyclopædia* it appears under the head of *Piper nigrorum*, or negro pepper, with the remark that Serapion and Avicenna mention a plant which they term *fulful alsuaden* (or rather سودان or فلفل السود *Felfel el soud* or *Soudan*) since properly designated Ethiopian pepper, having "a sort of hot seeds approaching to the nature of the common pepper, and containing several together in pods."† It is very doubtful, however, whether the *felfel-el-soudan* of these authors does not apply to the *Capsicum fructescens* or *Piper longum*, the former of which is still distinguished in Northern Africa either by this appellation or that of بر للعبيد or فلفل للبر (*felfel el bir* or *bir el abeed*) *i.e.* pepper from the land of slaves, or Soudan, inasmuch as the *Piper Ethiopicum* had been described previously by them under the above term of *hab-el-zelim*. The دار فلفل (*dar-felfel*) and حب للفلفل (*hab.-el felfel*) of these writers, evidently refers to the *Piper longum* and *nigrum*.

Lyons in his travels in Northern Africa, has noticed this among other species of pepper enumerated as articles of commerce brought from Soudan to Fez by the Moorish traders, and the authors of the *Flore Senegambie*, under the title of *Uvaria Ethiopica*, state that it is the *N'Ghiarr* of the Ioloffs, and constitutes also with them a mercantile product, chiefly on account of its utility as a condiment, and for culinary purposes.‡ Don in his *Gardener's Dictionary* affords a brief outline of the plant as the *Unona Æthiopica*.§ Guibourt in the last edition of his *Histoire Naturelle des Drogues*, has given a good illustration of the pods and seeds, with a short description of them by that of *Poivre d'Ethiopie*.‖ The subjoined botanical detail has been derived from the *Mémoire d'Anonacées* of M. Alphons. De Candolle.

Habzelia.

Char.—Calyx trilobus. Corolla 6-petala, petalis interioribus, minoribus. Stamina numerosissima. Torus convexus. Carpella distincta, numero indefinito, elongata, cylindracea, obsolete ventricosa, glabra, longitudinaliter striata, pericarpio accrescente multilocularia, polysperma. Semina ellipsoidea, arillata, sub-erecta, numerosa, solitaria in loculamentis pericarpii, nitida. Arillus e duabus membranis obcordatis inæqualibus albis constans.

Veg.—Frutices, foliis acutus subtus pubescentibus, pilis simplicibus, pedunculis unifloris. Fructus aromatici interdum sapore pungentes, et ideo pro condimentis vel (olim) in officinis adhibiti.

Habit.—Africa occidentalis el America meridionalis.

Genus inter Unonas el Xylopias medium. Ab Unonâ differt seminibus arillatis, carpellis glabris striatis et nunquam regulariter moniliformibus, a Xylopiâ carpellis magis elongatis et obsolete ventricosis, toroque verosimiliter non concavo. Nomen ex *Habzeli*, antiquo nomine Unonæ Æthiopicæ, Dun. in C. Bauhino citatum.

Species hucusque notæ.

1 H. Æthiopica (Habzeli et Piper Nigrorum, Serapioni *C. Bahiino pin. p.* 412. Piper Æthiopicum. *Math. Comm.* i. *p.* 434 *ic. Lob. ic.* 2, *t.* 205. Unona Æthiopica, *Dun. Mon. p.* 113, D. C.! *Syst.* 1, *p.* 496. Uvaria Æthiopica *Rich. in Flor. Senegamb.*, *p.* 9.)

Hab. in Æthiopiâ (Math.) in Sierra Leona (Smeath. in h. D. C.!) et in Senegambiâ (Lep. et Perrot.) Rami lignosi, inferne glabri, lenticellis minimis, rotundis notati, apice tenues et velutini. Folia ovato-acuta 3 poll. longa, 12-14 lin. lata, superne glaberrima, subtus puberula, pilis adpressis lente solum perspicuis, nervo centrali prominulo, aliis minimis reticulatis, petiolis 2 lin. longis, glabris, canaliculatis. Pedunculi axillares (an semper ?) fructiferi crassi, lignosi,

* *Descrip. d'Egypt. Nat. Hist.*, *vol.* ii., *p.* 81. † *Vol.* xxvii.
‡ *Travels*, &c., *ch.* 4, *p.* 156 ; and *in Flor. Senegamb.*, *p.* 9.
§ *Vol.* i., *p.* 95. ‖ *Vol.* iii., *p.* 676, *f.* 429.

nudi, 4 lin-longi. Flores ignoti. Torus (fructifer) capitatus, 3 lin. latus, cicatricibus carpellorum numerosis rotundatis lineam latis impressus. Carpella 12-18 siliquam simulantia 1-2 poll longa, torulosa, striata, glaberrima, sapore Piperis. Semina 8-12 nigricantia 3 lin. longa. Arillus lineam longus, lobis 2 subæqualibus (ex spec. Smeath).

2 H. Aromatica (Waria zeylanica, *Aubl. Guian.*, 2, *p.* 605, *t.* 243, *excl. syn. Pluk.* Unona Aromatica, *Dun. Mon. p.* 112, D. C. *Syst.* 1, *p.* 495, vulgo maniguette).

3 H. discreta, (Unona discreta, *Linn. f. suppl.*, *p.* 270) &c.

4 H. undulata (Xilopia undulata *Pal. de Beauv. fl. Ow. et. Ben.*, *p.* 27, *t.* 16. Unona undulata *Dun.! Mon. p.* 111, D. C. ! *Syst.* i., *p.* 494) Habet in regno Owariensi (Beauv.).

Florem satis truncatum vidi, a Xilopiis habitu diversissimum. Torus convexus videtur, staminibus numerosissimis tectus. Petala interiora, ab aliis valde diversa, triangularia, centrum floris obtegentia, intus lanuginosa. Carpella (extabulâ) illis præcedentium satis similia. An semen arillatum?

Cel. R. Brown (Congo, p. 6) de specie *piperi Æthiopico* affini loquutus est, sed descriptionem non dedit. *Mémoires de la Société de Phys. et d'Hist. Natur. de Genève, vol.* v, *p.* 207.

The species of Ethiopian pepper indigenous to tropical Africa, are in general moderately sized trees, seldom exceeding twenty or thirty feet in height, and found usually growing either within the cultivated precincts of the towns, or on farms immediately adjoining them. They are not so prevalent in the maritime as inland districts, since the dried pods are more frequently transmitted from the latter to the markets of the coast for sale or exportation. The Habzelia Æthiopica flowers in the months of October and November, or about the termination of the rainy season, and the fruit attains maturity in January and February. The pods appear in clusters at first of a dark green, but rapidly becoming black upon exposure to the sun when detached from their stem. Each pod contains from eight to ten round shining blackish seeds, which possess a mild and pleasant terebinthinate flavour with an aromatic pungency. Different portions of the plant likewise exhale an aromatic fragrancy, mostly conspicuous however from the flowers during the period of their evolution. It flourishes in many parts of Senegambia, in the interior districts of the Nunez, in the mountains of Sierra Leone, on the Kroo-coast and Liberia, in the Gulf of Guinea, Yorruba, Haussa and other countries on the Niger, in Loango, and the adjoining kingdoms of the Kongo, and in Angola and Benguela.

The inhabitants of these countries value it principally on account of its stimulant and carminative effects, and exhibit preparations of the fruit in several visceral affections. When combined with other native medicines, it not only increases their activity and power, but contributes greatly to aid in their beneficial action in cases of colic, dyspepsia, diarrhœa, rheumatism, &c. The Timmanes, Soosus, and other circumjacent tribes frequently resort to this pepper as an anthelmintic, and with success, and it is probably the seeds of the same plant mentioned by Afzelius, under the designation of *Uvaria Piperita*, which he remarks were united with a decoction of a bark called by the Timmanes *Argol*, and the Bulloms *Kentang*, and administered daily in the morning mixed with rice, until the expulsion of the worms had been effected.* Winterbottom in words almost identical confirms his statements, and avers that the natives in the neighbourhood of Sierra Leone, in abstaining from various kinds of food supposed to induce Krakra, an ordinary cutaneous disease, among others avoid the same product "*seu Piper Æthiopicum*," commonly used to season their dishes, and termed by the Timmanes *Atchill*, and Bulloms *Neeshon*.† In Yorruba it is known by the denomination of *Aru* or *Aeroo*, and by that of *Pice* amongst some of the Ebo races. By them the seeds are

* *Remedia Guineens*, *p.* 61. † *An Account of the Nat. Africans*, *vol.* ii., *p.* 165.

reduced to a fine powder, and applied externally in cephalalgia, rheumatic enlargements of the joints, and in painful abdominal affections, for the treatment of which it is not unfrequently conjoined with lime-juice. In the debility resulting from protracted labours, or when flooding has occurred after the expulsion of the placenta, it has been deemed a valuable adjunct to the other remedies advocated.

As a condiment the Ethiopian pepper is occasionally employed to flavour the medicinal and customary native soups, and also comprehends one of the substances that the fetishmen have recourse to in the manufacture of their greegres, or charms and fetish dishes.

The second species of African Habzelia, more common perhaps to the Gulf of Guinea, has been well described and figured in the *Flore d'Oware* of Palisot de Beauvois, by the name of *Xilopia undulata*. This botanist states that it is a shrub of moderate dimensions, and its fruit was used by the natives as a stimulant either alone or incorporated with their food. He considered it capable to a certain extent of superseding those spices conveyed at a great expense from India, as it was much milder without being less aromatic or less pungent; and that he therefore felt convinced it would ultimately be found profitable as an article of commerce.*

CHEMICAL AND MICROSCOPICAL EXAMINATION OF SARCINA VENTRICULI.

BY W. W. STODDART.

The rather rare and very singular morbid condition of the stomach containing the sarcinæ, has only for the last one or two years attracted the attention of pathologists, in consequence of the increased use of the microscope in the investigation of animal structure. It was originally discovered by Goodsir, some ten or twelve years since. The present opportunity of examining this remarkable alga was afforded by the kindness of Mr. Norton, Surgeon to the Bristol Dispensary.

The fluid when first ejected had the sp. grav. of 1.034, and the appearance and exact *odour* of yeast, and in so active a state of fermentation that in twenty minutes it rose three-quarters of an inch in the tumbler in which it was brought. In half an hour the fermenting matter separated into a thick sediment, and a layer an inch thick of flocculi of a brown colour floated on the surface, rapidly disengaging bubbles of gas.

It was very acid to test-paper. The supernatant layer was very greasy from the fat and oil globules. A drop of the flocculent matter placed under a Ross's $\frac{1}{4}$-inch objective showed abundance of the sarcinæ (*a*) having a light green colour, and had the peculiar quadrilateral division into masses of from four to sixteen cells in each. Dilute acids, alkalies, or iodine had no marked action on them, even after having been laid aside for four or five days, though the latter (iodine) turned them a browner colour. Scaly epithelium (*b*), oil or fat globules (*c*), and starch (*d*), partially digested, were very plentiful on the field, interspersed with torulæ (*e*) and fragments of muscular fibre. The starch granules showed the rings and hilum very distinctly. The fluid filtered produced a clear liquid of a light amber colour, having a sp. gr.=1.018.

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* *Vol.* i., *p.* 28, *pl.* xvi.

Heat and nitric acid proved the presence of albumen.

A. 1. 1000 grains of the fluid were thrown on a weighed filter, and the residue washed with cold distilled water, dried on a water-bath, and weighed—giving a result of 35.51 grs.

2. The filtered liquid and washings were then mixed and evaporated to dryness, when the solid residue weighed thirty-seven grains, containing the saline and organic matter, and was a glutinous greenish-black extract.

3. This extract was then repeatedly digested with warm alcohol (sp. gr. 833°) till all the substances soluble in that menstruum were removed. The solution evaporated and weighed gave 9.2 grains of a sticky extract, rather lighter in colour than the former. This, again dissolved in alcohol and evaporated to two-thirds, was set aside for some of the salts to crystallize, and to be further tested for lactic acid.

4. The residue remaining from the separation of the alcoholic extract, dissolved in water, gave a distinct odour of *butyric acid* on the addition of lime and sulphuric acid.

B. 1. 500 grains of the liquid were then filtered and evaporated to dryness in a weighed porcelain crucible and ignited. The residual ash weighed 12.964 grains. This deducted from 18.5 grs. of previously ascertained solid matter in 500 grs. (*a*. 2) minus 4.6 grs. of alcoholic extract (*a*. 3), gave .94 grs.×2=1.89 grains of extractive matter in 1000 grs. (albumen, butyrates, &c.) insoluble in alcohol.

2. The residue was then washed with warm distilled water till all the soluble saline substances were removed, dried, and ignited. The ash weighed 3.7 grs.×2=7.4 grs. of insoluble earthy salts in 1000.

3. The washings were then collected and evaporated, when the usual tests showed the presence of phosphoric and sulphuric acids, chlorine, potass, and soda. The amount was calculated from insoluble salts, 3.7 deducted from 12.964 total amount of saline matter, giving 9.26 grains in the 500, or 18.52 in the 1000 of liquid as a total of soluble salts.

4. 500 grs. of the liquid were then taken for estimation of chlorine by nitric acid and nitrate of silver, and produced 4.4 grs.×2=8.8 grs. of silver salt in 1000, which were equivalent to 2.17096 of chlorine.

5. The alcoholic solution (*a*. 3) was then examined for lactic acid. It was filtered from crystalline deposit, treated with sulphuric acid and alcohol, and again filtered. Baryta water was then added, and the excess removed by carbonic acid. To the filtered solution, evaporated and again filtered to remove more salts, was added a little more alcohol, and then decomposed with lime. A drop of the filtered solution afforded under the object-glass beautifully characteristic "brushes" of lactate of lime. The solution was again evaporated to dryness, and dissolved in a little warm water, boiled rapidly for a few minutes, filtered, and a piece of zinc rod immersed. In about two hours it was covered with well-defined little prisms of lactate of zinc.

The above experiments indicated the following summary:—

Sarcinæ, oil and starch globules, epithelium scales, torulæ, &c. ...	35.51
Lactic acid and organic matter, soluble in alcohol	9.2
Butyric acid, organic matter insoluble in alcohol, and albumen ...	1.89
Chloride of sodium	3.61
Soluble salts	14.9
Insoluble earthy salts	7.4
Water.....	927.49
	1000.00

North Street, Bristol, August 14, 1854.

ON ALUMINIUM AND ITS CHEMICAL COMBINATIONS.

BY M. H. SAINTE-CLAIRE DEVILLE.

It is known that Wöhler obtained aluminium in a pulverulent state by treating the chloride with potassium. By carefully conducting Wöhler's process the decomposition of the chloride of aluminium may be so managed as to produce sufficient incandescence to render visible the agglomeration of the metal into globules. If the mass composed of the metal and of chloride of sodium (it is preferable to use sodium) be heated to bright redness in a porcelain crucible, the excess of chloride of aluminium will be driven off, and there will remain a saline mass having an acid reaction, in the midst of which will be found globules, varying in size, of perfectly pure aluminium.

This metal is as white as silver, malleable and ductile in the highest degree. But when worked it appears to become harder, and its tenacity probably approaches nearly to that of iron. It may be hardened, and again softened by annealing. Its density is 2.56. It may be melted and run out in the air without being sensibly oxidized. It is a good conducter of heat.

Aluminium is completely unalterable in dry or moist air. It does not become tarnished, and remains bright by the side of freshly cut zinc and tin while the latter lose their brilliancy. It is not acted upon by sulphuretted hydrogen. Cold water has no action upon it, and boiling water does not tarnish it. Nitric acid, either diluted or concentrated, and diluted sulphuric acid, when applied cold, are also without action upon it. Its true solvent is hydrochloric acid, which evolves hydrogen and forms sesquichloride of aluminium. When heated to redness in hydrochloric acid gas, dry and volatile sesquichloride of aluminium is produced.

It will be seen that a white metal, unalterable like silver, which does not blacken when exposed to the air, which is fusible, malleable, ductile, and tenacious, and which presents the remarkable property of being lighter than glass, may be rendered very useful if it could be easily obtained. When it is considered that this metal exists in considerable quantity in nature, its ore being clay, we can but wish that it may become common. I have every reason to believe that it may be so, for chloride of aluminium is decomposed with remarkable facility, at an elevated temperature, by the common metals, and a reaction of this sort which I am now conducting on a larger scale than a mere laboratory operation, will decide the question in a practical point of view.—*Journal de Pharmacie.*

CHEMICAL ANALYSIS OF THE MINERAL WATERS OF HARROGATE.

BY PROFESSOR A. W. HOFMANN.

Report addressed to the Chairman of the Water Committee in Harrogate.

(*Concluded from page* 77.)

In collecting and analysing the *gases* contained in the Harrogate waters, I have availed myself of the processes invented by Professor Bunsen, and so remarkably perfected within the last few years by his admirable researches. Since these processes, especially those of collecting the gases, differ from the methods formerly adopted for this purpose, and since any accurate information regarding the nature of the gases, however precise our methods of analysis may be, depends, in the first place, on the means we employ for collecting and measuring their total amount, I will briefly describe here the principal features of Bunsen's process, which consists in expelling the gases by ebullition *in vacuo.*

For this purpose a globular glass flask, over the neck of which is fitted a strong vulcanized caoutchouc tube (*see* fig. 1), is immersed in the water until it is filled, and the tube is then closed by means of a brass screw-clamp, which is screwed immediately above the neck of the flask.

In this manner a quantity of water is secured which has not been in contact with the air, and the exact volume of which may be readily determined by experiment.

Fig. 1.

The caoutchouc tube is then connected with a small glass globe partially filled with water, and provided with two necks opposite each other, the one corresponding in diameter to the neck of the flask, the other of the size of an ordinary quill pen. By the latter, the globular vessel, which for the sake of shortness I will call the "boiler-globe," may be connected with a glass tube about ten inches long, and three-quarters of an inch wide, and terminating on each side in a narrow open connecting tube, corresponding in width to the narrow tube of the boiler-globe. The connexion of the latter and the tube, which may be termed the "gas-receiver," is effected by means of a caoutchouc tube just sufficiently long to admit between the two glass tubes, which are fixed into its ends, the application of a small brass screw-clamp, by means of which arrangement communication between the two vessels may be established or interrupted. In a perfectly similar manner, the other extremity of the gas-receiver is connected with an ordinary delivery tube which discharges into water.

Fig. 2.

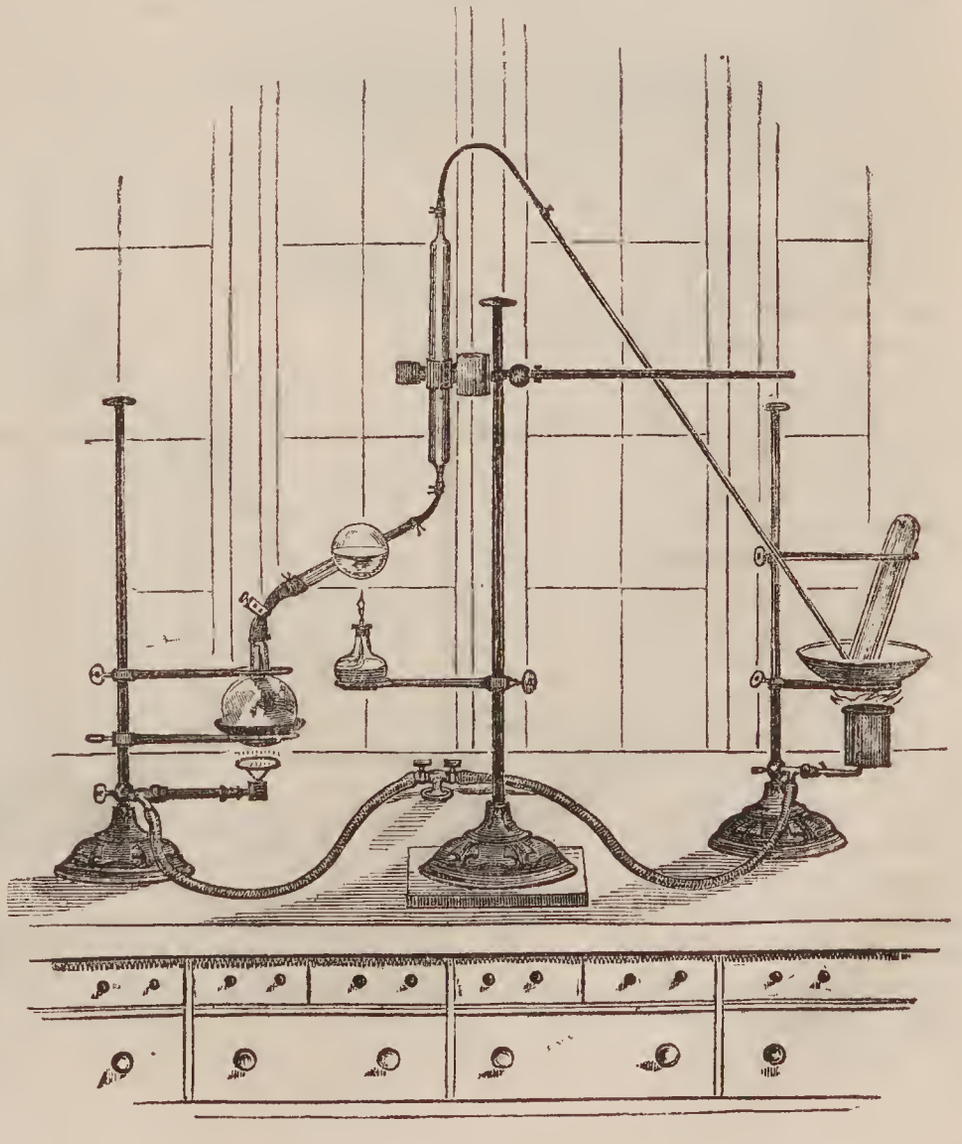


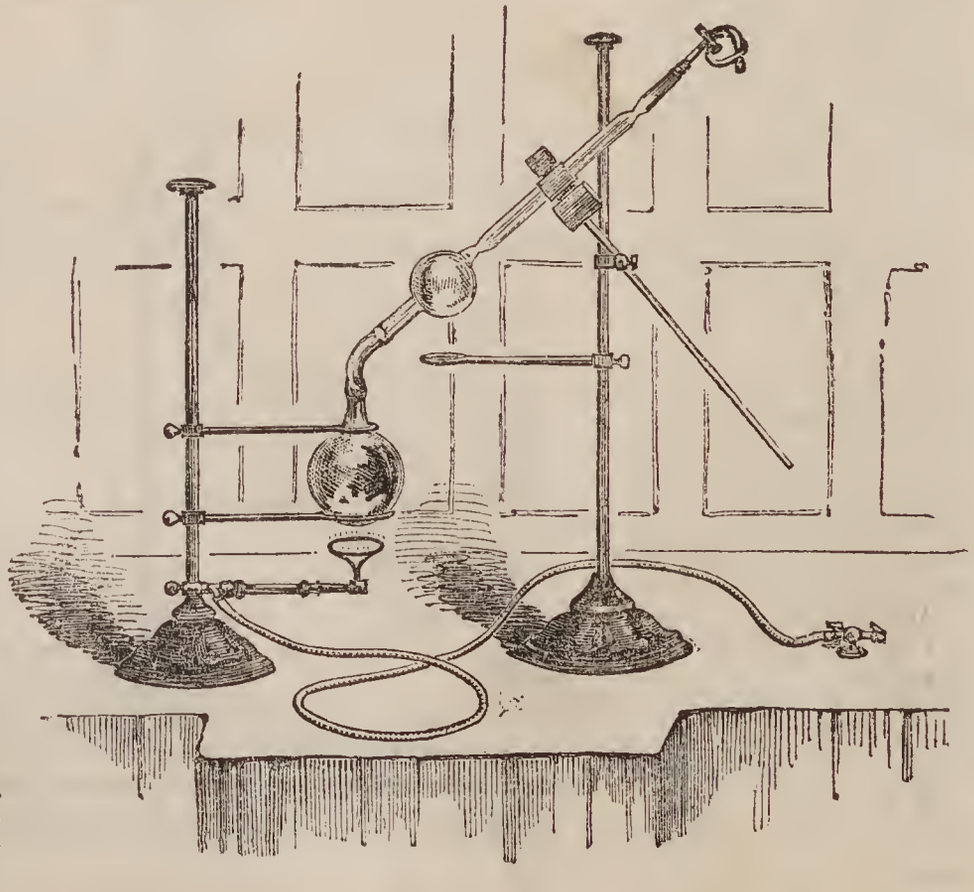
Fig. 2 represents the apparatus fitted up, and fixed upon an ordinary gas-stand. The water-flask is closed with a screw-clamp, but the communication between the boiler-globe, gas-receiver, and delivery-tube, is perfectly free. The water in the boiler-globe is heated to ebullition by means of a spirit-lamp, and kept boiling for about a quarter of an hour, by which time all the air in the apparatus is perfectly replaced by steam, which may be ascertained, moreover, by not a trace of air collecting if the delivery-tube be made to discharge for a few minutes under an inverted bell-jar, filled with water. The caoutchouc tube, at the upper end of the gas-receiver, is now

closed by a brass clamp, and the spirit-lamp simultaneously removed, when the ebullition *in vacuo* will continue for a considerable time. The boiling-out of the water in the flask may now commence. For this purpose the brass clamp is removed, and the flask submitted to a gradually increasing heat. Air-bubbles soon make their appearance, but a quarter of an hour generally elapses before the caoutchouc tube, which is collapsed and almost flattened by the atmospheric pressure, is sufficiently expanded to admit of a free communication between the flask and the upper part of the apparatus. The water gradually enters into violent ebullition, in which state it is kept for about an hour, so as to ensure the complete expulsion of every trace of gas. When this point has been reached, the heat is increased for a moment, and a good deal of steam is generated in the flask, which causes the water gradually to rise from the boiler-globe into the narrow end of the gas-receiver. At this moment the flask is closed with the clamp, and the source of heat removed; the water in the boiler-globe begins to cool, gradually contracts, and descends in the narrow tube of the gas-receiver; the very moment its level disappears under the caoutchouc connector, the clamp between the boiler-globe and gas-receiver is fastened, and the whole apparatus disconnected. The gas-receiver closed at both its extremities by caoutchouc, contains the whole of the gas, together with a few drops of water: the volume of the gas may be readily measured by opening one of the clamps under mercury, and allowing the metal to enter the gas-receiver, until it stands at the same level within and without the tube; the clamp is then secured again, and the mercury transferred into a graduated cylinder. The difference between the volume of mercury, and the known capacity of the gas-receiver, represents the volume of gas at the existing barometric pressure and temperature.

The only conditions necessary for the success of this apparently complicated process, are a sufficiently long ebullition, and a proper proportion in the capacities of the water-flask and gas-receiver, which can only be attained by a few preliminary operations. The capacity of the gas-receiver must be greater than the volume of the gas in the water-flask, when measured under the ordinary pressure of the atmosphere. If the volume of the gas were greater, the gas-receiver or the caoutchouc connector might burst, and if they actually withstood the outward pressure, a certain quantity of gas would be lost on opening the clamp under mercury.

The same apparatus might be used for collecting the gas intended for analysis; but unless the gas can be transferred at once into the eudiometer, it is better to construct the boiler-globe and gas-receiver of one piece of glass, and to have the ends of the receiver so far drawn out that they may be sealed by means of a blow-pipe jet. This tube, in the moment before sealing it, is represented in fig. 3, which requires no further explanation. The above process furnishes the gases which are dissolved in the water. The gases, however, which rise in bubbles from several of the waters, were

Fig. 3.



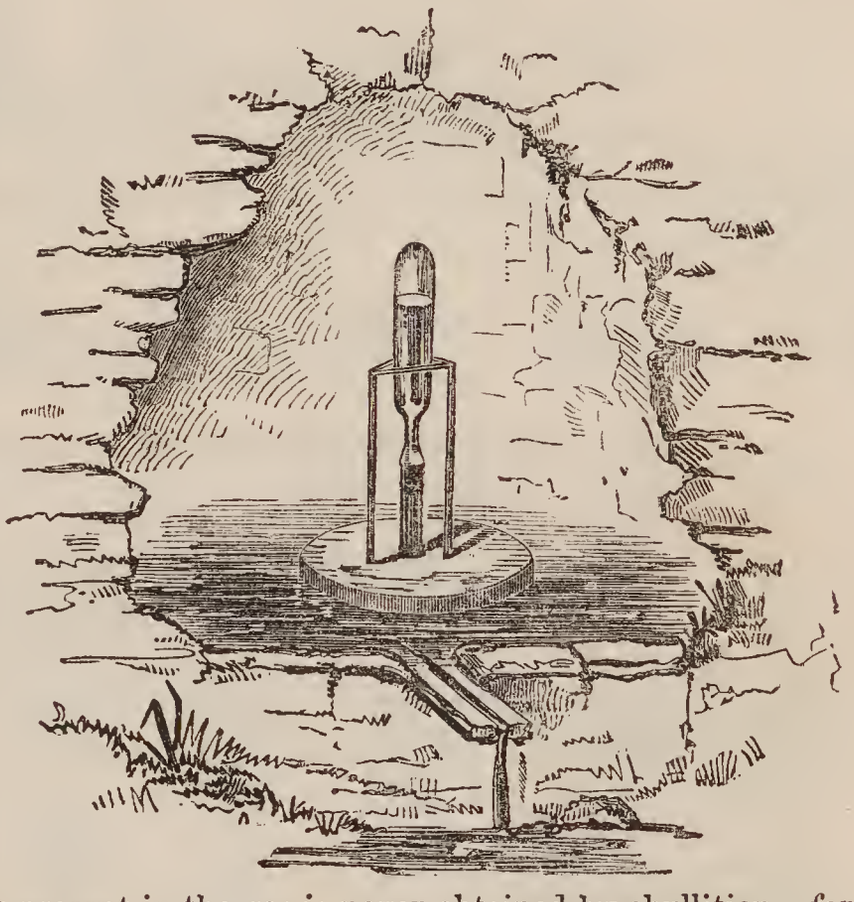
collected in a small glass-receiver constricted at one point to facilitate the subsequent sealing. This receiver (fig. 4) is supported by an iron tripod, and fixed by means of a strong caoutchouc connector into a large perforated wooden float, the lower surface of which is hollowed out so as to collect the gas-bubbles, and cause them to ascend into the receiver, which is filled with water at the commencement of the operation. As soon as the receiver is filled, the caoutchouc connector is closed by means of a screw-clamp, the receiver disconnected and sealed before the blow-pipe.

Qualitative analysis, as has been stated, showed the gases to consist of oxygen, nitrogen, carbonic acid, light carbonetted hydrogen (marsh gas), and in several cases of sulphuretted hydrogen. Besides these gases, in one or two cases minute traces of another hydrocarbon were observed, the presence of which was indicated by the peculiar smell of the gas.

The analysis was performed in the Volta-eudiometer, graduated and calibrated according to Bunsen's method.

After the removal of carbonic and hydrosulphuric acids by means of potash-balls, the carbonetted hydrogen was exploded with a known volume of oxygen, and estimated from the volume of carbonic acid produced after explosion. The subsequent explosion, with a known volume of hydrogen, of the residue, freed from carbonic acid by means of a potash-ball, showed the presence and indicated the quantity of oxygen. The nitrogen was determined by difference.

Fig. 4.



The amount of sulphuretted hydrogen in the gases was determined by a graduated solution of iodine in iodide of potassium, added from a burette to a solution of the potash-ball (which had served for the absorption of this gas and of the carbonic acid) in water acidulated with acetic acid.

The total quantity of sulphuretted hydrogen which is present in the gas is never obtained by ebullition; for in the first place, a certain quantity s destroyed by the air which is in contact with the water; and, secondly, because a certain quantity is present in the form of sulphide of sodium, which is but imperfectly decomposed by the ebullition of the water. On this account, the total amount of sulphuretted hydrogen was also separately determined at the well, by means of the graduated solution of iodine in iodide of potassium, which has been already mentioned. This method, originally proposed by Dupasquier, and lately improved and expanded by Bunsen, is equally remarkable for its precision, and the rapidity of its execution.

All the determinations of sulphuretted hydrogen were made in the middle of February, 1854, and I mention this particularly since the amount of this compound appears to be subject to considerable variation. My attention was first directed to this subject by Dr. Bennett, whose valuable researches leave no doubt in this respect.* Dr. Bennett has had the kindness to repeat, with the same burette and the same standard solution which I had myself employed, the sulphuretted hydrogen determinations in some of the waters, after the lapse of several months, when considerable variations became manifest (see old Sulphur Well, and Hospital Mild Sulphur Spring). These changes may be partly due to influences which affect the

* Report on the Sulphur Springs of Harrogate, for the years 1841 and 1842. London, 1843.

strata from which these waters emanate; to a great extent, however, they must be ascribed to the action of the atmosphere. It is well known how readily sulphuretted hydrogen is oxidized, and that the greatest care must be taken to protect the sulphur waters from contact with the air, especially if they are to be stored for any length of time.

The sulphuretted hydrogen exists in the Harrogate waters, partly free, partly in combination with metallic oxides. Only a portion can be expelled by boiling. We have not at present sufficient data to calculate, with any degree of certainty, the amount of sulphuretted hydrogen which is free, and that which is combined; and I have, therefore, introduced into the report the whole quantity in the form of sulphide of sodium, the total amount of sulphuretted hydrogen gas being moreover expressed in cubic inches.

The following Tables exhibit the results of the analyses, synoptically arranged :—

A.—Sulphur Waters.

	I. Old Sulphur Well.	II. Montpellier Strong Sulphur Well.	III. Montpellier Mild Sulphur Well.	IV. Hospital Strong SulphurSpring	V. Hospital Mild Sulphur Spring.	VI. Starbeck Sulphur Spa.
Temperature of air	50° F. (10° C.)	44.6° F. (7° C.)	41° F. (5° C.)	35.6° F. (2° C.)	45.5° F. (7.5° C.)	47.3° F. (8.5°C.)
Temperature of water....	48.2° F. (9° C.)	46.4° F. (8° C.)	42.8° F. (6° C.)	41.9° F. (5.5° C.)	44.6° F. (7° C.)	48.2° F. (9° C.)
Specific gravity	1.01113	1.01045	1.00314	1.00515	1.0026	1.0018
Reaction..	powerfully alkaline.	alkaline	alkaline	powerfully alkaline.	alkaline	alkaline

GRAINS OF SALINE CONSTITUENTS IN 1000 GRAINS OF WATER.

	I. Old Sulphur Well.	II. Montpellier Strong Sulphur Well.	III. Montpellier Mild Sulphur Well.	IV. Hospital Strong Sulphur Spring.	V. Hospital Mild Sulphur Spring.	VI. Starbeck Sulphur Spa.
Sulphate of lime	0.0258	0.0084	0.1723	0.0734	0.0173	0.0123
Carbonate of lime.....	0.1747	0.3419	0.2913	0.3630	0.2820	0.0992
Fluoride of calcium	trace	trace	trace	trace	trace	faint trace
Chloride of calcium.....	1.1548	0.8753	—	—	—	—
Chloride of magnesium..	0.7866	0.7729	0.2447	0.1648	0.0048	—
Carbonate of magnesia..	—	—	0.0463	0.0824	0.1469	0.0768
Chloride of potassium...	0.9141	0.0813	0.0566	0.1527	0.3557	—
Carbonate of potassa ...	—	—	—	—	—	0.1740
Chloride of sodium	12.2378	11.3542	3.3098	5.2446	3.1435	1.7368
Bromide of sodium	trace	trace	trace	trace	trace	trace
Iodide of sodium	trace	trace	trace	trace	trace	trace
Sulphide of sodium	0.2187	0.2038	0.0484	0.1017	0.0043	0.0244
Carbonate of soda.....	—	—	—	—	—	0.0732
Ammonia.....	trace	trace	trace	tracc	trace	trace
Carbonate of iron.....	trace	trace	trace	.0150	trace	trace
Carbonate of manganese	trace	trace	trace	trace	trace	trace
Silica	0.0034	0.0261	0.0024	0.0075	0.0212	0.0250
Organic matter	trace	trace	trace	0.0180	trace	0.0248
Total	15.5159	13.6639	4.1718	6.2231	3.9757	2.2465
Total residue (by experiment).....	15.4780	13.5581	4.1029	6.2589	3.8935	2.2638

GRAINS OF SALINE CONSTITUENTS IN THE GALLON OF WATER.

	I. Old Sulphur Well.	II. Montpellier Strong Sulphur Well.	III. Montpellier Mild Sulphur Well.	IV. Hospital Strong Sulphur Spring.	V. Hospital Mild Sulphur Spring.	VI. Starbeck Sulphur Spa.
Sulphate of lime	0.182	0.594	12.104	51.660	1.215	0.870
Carbonate of lime	12.365	24.182	20.457	25.560	19.794	6.960
Fluoride of calcium	trace	trace	trace	trace	—	faint trace
Chloride of calcium	81.735	61.910	—	—	—	—
Chloride of magnesium.	55.693	54.667	17.140	11.595	0.336	—
Carbonate of magnesia..	—	—	3.251	5.797	10.310	5.390
Chloride of potassium...	64.701	5.750	3.975	10.751	24.970	—
Carbonate of potassa ...	—	—	—	—	—	12.207
Chloride of sodium	866.180	803.093	232.413	369.014	220.630	121.798
Bromide of sodium	trace	—	trace	trace	trace	trace
Iodide of sodium	trace	—	trace	trace	trace	trace
Sulphide of sodium	15.479	14.414	3.398	7.155	0.301	1.711
Carbonate of soda	—	—	—	—	—	5.133
Ammonia	trace	trace	trace	trace	trace	trace
Carbonate of iron	trace	trace	trace	1.060	trace	trace
Carbonate of manganese	trace	trace	trace	trace	trace	trace
Silica	0.246	1.840	0.165	0.535	1.49	1.753
Organic matter	trace	trace	trace	1.327	trace	1.740
Total	1096.580	966.456	292.903	437.966	279.046	157.562

GASES

DISSOLVED BY THE WATERS AND EXPELLED BY EBULLITION IN VACUO.

Composition in 100 volumes.

	I. Old Sulphur Well.	II. Montpellier Strong Sulphur Well.	III. Montpellier Mild Sulphur Well.	IV. Hospital Strong Sulphur Spring.	V. Hospital Mild Sulphur Spring.	VI. Starbeck Sulphur Spa.
Carbonic acid	61.06	70.62	62.50	31.79	44.07	49.78
Carbonetted hydrogen...	16.17	2.71	3.99	0.52	22.80	27.71
Sulphuretted hydrogen	14.69	—	—	1.81	—	trace
Oxygen	—	2.46	—	—	7.82	—
Nitrogen	8.08	24.21	33.51	65.88	25.31	22.51
Total	100.00	100.00	100.00	100.00	100.00	100.00

CUBIC INCHES OF THE GASES IN THE GALLON OF WATER.

	I. Old Sulphur Well.	II. Montpellier Strong Sulphur Well.	III. Montpellier Mild Sulphur Well.	IV. Hospital Strong Sulphur Spring.	V. Hospital Mild Sulphur Spring.	VI. Starbeck Sulphur Spa.
Carbonic acid	22.03	14.01	14.28	9.54	10.20	9.26
Carbonetted hydrogen...	5.84	0.53	0.90	0.15	5.28	5.15
Sulphuretted hydrogen	5.31	—	—	0.54	—	trace
Oxygen	—	0.48	—	—	1.81	—
Nitrogen	2.91	4.82	7.67	19.78	5.87	4.21
Total	36.09	19.84	22.85	30.01	23.16	18.62

TOTAL VOLUME (IN CUBIC INCHES) OF SULPHURETTED HYDROGEN IN THE SEVERAL WATERS.

I. Old Sulphur Well	24.0 February, 1854	26.9 March, 1854
II. Montpellier Strong Sulphur Well	23.35 May "	25.4 May "
III. Montpellier Mild Sulphur Well	5.262 February "	
IV. Hospital Strong Sulphur Spring	10.888 "	
V. Hospital Mild Sulphur Spring	0.368 "	3.54 March "
VI. Starbeck Sulphur Spa	2.103 "	

COMPOSITION OF THE GASES (IN 100 VOLUMES) RISING FROM THE WATERS IN BUBBLES.

	I. Old Sulphur Well.	IV. Hospital Strong Sulphur Spring.
Carbonic acid	3.28	0.09
Carbonetted hydrogen	40.00	—
Sulphuretted hydrogen	trace	trace
Oxygen	—	—
Nitrogen	56.72	99.91
	100.00	100.00

B.—Chalybeate Waters.

	I. Montpellier Saline Chalybeate Water.	II. Cheltenham Saline Chalybeate Water.	III. Tewitt's Well.	IV. St. John's Well.
Temperature of air	44.2° F. (6.8° C.)	46.4° F. (8° C.)	49.1° F. (9.5° C.)	46.7° F. (8.2° C.)
Temperature of water	46.4° F. (8° C.)	40° F. (4.8° C.)	46.4° F. (8° C.)	46.4° F. (8° C.)
Specific gravity	1.0094	1.003	1.000108	1.00017
Reaction	markedly alkaline	very feebly alkaline	alkaline	alkaline

GRAINS OF SALINE CONSTITUENTS IN 1000 GRAINS.

	I. Montpellier Saline Chalybeate Water.	II. Cheltenham Saline Chalybeate Water.	III. Tewitt's Well.	IV. St. John's Well.
Sulphate of lime	—	—	0.0090	0.0043
Carbonate of lime	—	0.1590	0.0205	0.0323
Fluoride of calcium	—	trace	—	?
Chloride of calcium	2.3530	0.7351	—	—
Chloride of magnesium	0.5038	0.4845	—	—
Carbonate of magnesia	0.5880	—	0.0381	0.0434
Chloride of potassium	0.1611	0.3903	0.0189	—
Carbonate of potassa	—	—	0.0151	0.0141
Chloride of sodium	9.2960	2.2617	0.0040	0.0220
Bromide of sodium	trace	trace	trace	?
Iodide of sodium	trace	trace	trace	?
Carbonate of soda	—	—	—	0.0191
Ammonia	trace	trace	trace	trace
Carbonate of iron	0.0395	0.0659	0.0194	0.0087
Carbonate of manganese	trace	trace	trace	?
Silica	0.0134	0.0206	0.0220	trace
Organic matter	trace	0.0400	0.0095	trace
Total	12.9548	4.1071	0.1565	0.1439
Total residue (by experiment)	12.7561	4.0096	0.1554	0.1365

GRAINS OF SALINE CONSTITUENTS IN THE GALLON OF WATER.

	I. Montpellier Saline Chalybeate Water.	II. Cheltenham Saline Chalybeate Water.	III. Tewitt's Well.	IV. St. John's Well.
Sulphate of lime	—	—	0.697	0.307
Carbonate of lime	—	7.604	1.435	2.264
Fluoride of calcium	—	trace	—	?
Chloride of calcium	159.278	51.629	—	—
Chloride of magnesium	35.635	34.027	—	—
Carbonate of magnesia	41.796	—	2.667	3.039
Chloride of potassium	11.383	27.410	1.323	—
Carbonate of potassa	—	—	1.057	0.991
Chloride of sodium	656.838	158.840	0.280	1.543
Bromide of sodium	trace	trace	trace	?
Iodide of sodium	trace	trace	trace	?
Carbonate of soda	—	—	—	1.338
Ammonia	trace	trace	trace	trace
Carbonate of iron	2.790	4.627	1.358	0.609
Carbonate of manganese	trace	trace	trace	?
Silica	0.947	1.450	1.041	trace
Organic matter	trace	0.282	0.663	trace
Total	908.667	285.869	11.021	10.091

GASES

DISSOLVED BY THE WATERS AND EXPELLED BY EBULLITION IN VACUO.

Composition in 100 volumes.

	I. Montpellier Saline Chalybeate Water.	II. Cheltenham Saline Chalybeate Water.	III. Tewitt's Well.	IV. St. John's Well.
Carbonic acid	71.83	76.4	66.66	67.63
Carbonetted hydrogen	7.15	19.6	—	0.68
Oxygen	1.52	4.0	2.82	3.04
Nitrogen	19.50		30.52	28.65
	100.00	100.00	100.00	100.00

CUBIC INCHES OF THE GASES IN THE GALLON OF WATER.

	I. Montpellier Saline Chalybeate Water.	II. Cheltenham Saline Chalybeate Water.	III. Tewitt's Well.	IV. St. John's Well.
Carbonic acid	24.17	19.50	11.85	14.95
Carbonetted hydrogen	2.40	5.00	—	0.15
Oxygen	0.51	1.02	0.40	0.67
Nitrogen	6.48		5.53	6.35
	33.56	25.52	17.98	22.12

MANUFACTURE OF SULPHATE OF MAGNESIA.

(*Concluded from page 74.*)

Manufacture of Sulphate of Magnesia from Dolomite or Magnesian Limestone.—Dr. Henry, of Manchester, appears to have been the first person who made sulphate of magnesia from magnesian limestone. He took out a patent August 3, 1816, for this invention, the specification of which is as follows:—"I first expose the caustic magnesian lime, prepared by burning or calcining magnesian limestone, to the

action of certain acids, either combined with water only or with certain alkaline or earthy bases; which acids have a stronger attraction for lime than for magnesia, and at the same time form with lime compounds that are readily soluble by cold water. By the action of these acids, applied to the solid magnesian lime in such proportion as will be hereafter specified, I dissolve the greater part of the lime, and leave undissolved the greater part of the magnesia. Or otherwise I dissolve the whole of a given portion either of magnesian limestone or else of caustic magnesian lime in such a quantity of one of the said acids as is barely sufficient for the purpose; and I afterwards precipitate the magnesia by a due proportion either of common quick or magnesian lime, as will be more particularly described subsequently. The acids by means of which I dissolve the lime of the caustic magnesian lime, leaving the magnesia undissolved, are the following: The acetous acid, either in the form of vinegar or of pyrolignous acid obtained by the distillation of wood or tar; nitric acid; muriatic acid, either combined with water only or as it exists in muriate of magnesia, or in muriate of ammonia; and oxymuriatic acid or chlorine, either in a gaseous state, or in a state of watery solution. The first step which it is necessary to take, as a preliminary to any of those processes in which the caustic magnesian lime is to be employed, is to reduce the said lime to powder, either by mechanical means, or (which I greatly prefer) by converting it into what is called, in chemical language, a hydrate; which last object is effected by adding barely as much water to the fresh-burnt magnesian lime as will cause it to fall into a powder, or else by leaving it exposed to the atmosphere till it has spontaneously acquired water enough for that purpose. This powder is to be passed through a fine wire sieve.

When the acetous or pyrolignous acid is employed, I first ascertain how much of the said magnesian lime, or else of its hydrate, is sufficient to saturate a gallon of the same acid which I am about to employ; and to any number of gallons of the said acid I then add twice as much of the said magnesian lime, or else of its hydrate, as is necessary for the saturation of the number of gallons of the said acid which are actually used; for example, if 100 gallons of the said acid require for saturation forty pounds of the hydrate of magnesian lime, I add to the 100 gallons of the said acid eighty pounds of the hydrate; and I keep the said quantities of acid and hydrate in a state of mixture by mechanical agitation for a space of time not less than half an hour; and in preference for two, three, or four hours. I then allow the insoluble part to fall to the bottom of the vessel, and I decant the supernatant liquor and apply it to any of the purposes to which acetate of lime (which is the substance held in solution in the said liquor) is adapted. The undissolved portion, which is chiefly magnesia, I collect in linen-drainers, dry in any convenient manner, and when dry I calcine it at a low red heat, with free access of air (stirring it frequently) either in earthen or iron pots, or in a furnace, which may be of any shape adapted to the purpose. The object of this calcination is to burn away completely the tarry, resinous, and vegetable colouring matters, with which the said undissolved portion is contaminated. On any quantity of the calcined product last mentioned, reduced to a fine powder, and diffused through water of the temperature of the atmosphere, in the proportion of half a pound to each gallon of water or thereabouts, I then pour sulphuric acid of commerce, diluted with five or six times its weight of water, until the acid begins to be in slight excess. This excess of acid I neutralize by adding in successive portions, as long as is necessary, more of the said calcined product; after which I add a still further quantity of the said calcined product in the proportion of about a pound to every 100lbs. by weight of concentrated sulphuric acid of commerce; and I keep the mixture in a state of agitation for an hour or two before allowing it to remain at rest, or I unite the sulphuric acid to the said calcined product by using sulphate of iron in the following manner:—I dissolve any known weight of sulphate of iron in seven or eight times its weight of water at or near to the boiling temperature, and to the solution while hot I add a quantity of the said calcined product, finely pulverized, and equal in weight to about one-third part of the said sulphate of iron; and I keep the materials in a state of agitation for half an hour or longer. Or I dissolve a known weight of sulphate of iron in seven or eight times its weight of water of the temperature of the atmosphere, and after adding a quantity of the said calcined product, equal in weight to about one-third part of the said sulphate of iron, I agitate the mixture at intervals for about half an hour each time during one, two, or more days. In either case I assay by

means of any of the known chemical tests for iron a portion of the liquor first filtered through paper or cleared by standing; and if the whole of the said sulphate of iron proves not to be decomposed, I mix in successive portions more of the said calcined product with the said liquor until the decomposition of the sulphate of iron is ascertained to be complete. By any of these processes (of which, however, I greatly prefer that in which diluted sulphuric acid is used) I obtain a solution of sulphate of magnesia, which solution I suffer to clear itself by standing. I then draw off the clear liquor into a shallow boiler or evaporating vessel of iron or copper, and I wash the sediment repeatedly with water, adding the washings to the liquor in the aforesaid boiler, After reducing the liquor by evaporation to about one-third of its original bulk I allow it to cool, during which cooling it deposits a quantity of sulphate of lime. I then transfer the clear liquor into another boiler, and having heated it to nearly 212° Fah. I add to it either carbonate of magnesia in the proportion of about one ounce to every five wine gallons of the liquor, or otherwise I add to it calcined magnesia in the proportion of about one ounce to every ten wine gallons of the said liquor ; which liquor, after such addition, I keep heated for at least half an hour, stirring it frequently. I then allow the impurities to settle, and when the liquor has become clear I either draw it off into a shallow iron or copper boiler, in which I again evaporate it to a sufficient density to crystallize, or otherwise I apply it to the preparation of carbonate of magnesia by commonly known processes. In like manner, when I use the nitric or muriatic acid, I first determine by a previous experiment how much of either of the said acids of the strength I am about to use is sufficient for the saturation of the given weight of the hydrate of magnesian lime. In the next place I mix any number of pounds of either of the said acids previously diluted with ten or twelve times its weight of water with twice as much of the hydrate of magnesian lime as is necessary to saturate the quantity of acid actually in use. These materials I agitate together during at least half an hour. I then suffer the liquor to clear itself by standing, and when clear I draw off the solution of lime from the sediment, which sediment (consisting chiefly of magnesia) I wash repeatedly with water till the water comes off tasteless ; and I afterwards slightly super-saturate the said sediment with dilute sulphuric acid in the manner which has been already described. The slight excess of sulphuric acid existing in this case I then neutralize by the addition of a sufficient quantity of carbonate of magnesia. Or I unite the sulphuric acid to the said sediment by using sulphate of iron in the manner already specified, in which case I estimate the weight of the sediment at the rate of thirty-four parts from every 100 parts of hydrate of magnesian lime that have been used ; and I add to the said sediment a solution of three times its estimated weight of sulphate of iron. Should the sulphate of iron be proved by the application of the proper tests to be in excess, I decompose such excess by adding a sufficient quantity either of carbonate of magnesia or of magnesia obtained by any of the before mentioned processes from magnesian lime. And I continue to make these additions till the use of any of the tests for iron shows that such additions are no longer necessary.

Dr. Henry's process for decomposing magnesian lime by means of muriate of magnesia is as follows :—"I either take any quantity of the said muriate in a solid form (which is best obtained by evaporating to dryness the liquor, well known under the name of *bittern*, that remains after the muriate of soda and sulphate of magnesia have been separated from sea-water by processes generally known and practised), and I add to the said solid muriate of magnesia such a quantity of water that every gallon of the solution may contain about two pounds of the salt ; or if the muriate of magnesia is already in a liquid state, I ascertain the strength of the solution by evaporating an aliquot part of a gallon and weighing the dry salt. In either case I add to a quantity of the solution containing a known weight of muriate of magnesia an equal weight of the hydrate of magnesian lime, and I stir the materials together for at least half an hour, but in preference for two, three, or four hours. I then allow the undissolved parts to subside, and I decant the supernatant muriate of lime, after which I wash the sediment repeatedly with water till the water comes off tasteless. I then add dilute sulphuric acid to the said sediment till there is a slight excess of acid, which excess I saturate as aforesaid by carbonate of magnesia or else by magnesia which has been separated from magnesian lime by any of the methods before described. The remaining operations I conduct in the manner already described. Or I employ the sulphate of iron in the proportion

of three parts to one of the sediment, in which case I reckon the weight of the sediment to be about seventy parts for every 100 parts of hydrate of magnesian lime that have been employed, and I proceed in the remainder of the process exactly in the manner which has already been described. By the use of muriate of magnesia I obtain not only the magnesia which formed a constituent part of the magnesian lime, but also a further quantity of magnesia precipitated from the muriate of magnesia by the calcareous part of the said magnesian lime. To remove the lime from magnesian lime by means of muriate of ammonia I dissolve any quantity of solid muriate of ammonia in eight or ten times its weight of hot water, and I then add as much of the hydrate of magnesian lime as is equal to the weight of the said solid muriate of ammonia. These materials I stir together for at least half an hour. After allowing them to remain a sufficient time at rest I then decant the clear liquor and submit it to distillation for the purpose of obtaining solution of ammonia. The sediment from which the said liquor has been decanted I wash repeatedly with water, and either act upon it with dilute sulphuric acid or with sulphate of iron as aforesaid, reckoning the weight of the said sediment in the latter at thirty-four parts from every 100 parts which I have used of the said hydrate. When I employ oxymuriatic acid or chlorine to remove the lime from magnesian lime, I regulate the proportion of oxymuriatic acid or chlorine to the hydrate of magnesian lime by adjusting the quantity of materials which are used to afford the said gas to the quantity of magnesian lime employed to condense the gas. These proportions must necessarily vary with the purity of the materials from which the gas is obtained, and with the proportion of the said materials to each other, which is variously regulated by different persons. The proportions which I prefer for every bushel of common salt are 56lbs. of sulphuric acid of commerce, sp. gr. 1.85, 40 wine pints of water, and 40lbs. of finely-ground manganese. And (as a general rule) for every bushel of common salt or muriate of soda put along with the aforesaid ingredients into the still I allow at least 28lbs. of the hydrate of magnesian lime, which may either be placed in a dry state in a proper receiver, or be kept suspended in water by mechanical agitation in the way commonly practised by bleachers. When the combination has been made in the dry way I add water, in order to wash off the oxymuriate of lime. But when water has been put at first into the receiver I allow the materials therein contained to remain at rest for some time after the gas has ceased to come over, and I then draw off the liquid oxymuriate of lime. In either case I wash the insoluble part repeatedly with water, and I afterwards act upon it in the manner already described, either with dilute sulphuric acid or with sulphate of iron. In these cases, however, I prefer the dilute sulphuric acid, because to use sulphate of iron to advantage it would be necessary to estimate the weight of the undissolved portion with greater accuracy than can be conveniently attained. Indeed, I consider dilute sulphuric acid, whenever it can be obtained conveniently and at a reasonable price, to be much more fit than sulphate of iron for the purpose of preparing sulphate of magnesia. I sometimes find it advantageous to apply more than one of the said acids in succession ; for example, when the oxymuriatic acid has been used in a proportion not sufficient to take out the whole of the lime from a quantity of magnesian lime, I afterwards mix the undissolved part of the said quantity of magnesian lime with a due proportion of acetous, nitric or muriatic acid, or of muriate of magnesia, or muriate of ammonia, in the manner already described. When two acids are thus applied in succession to the same quantity of magnesian lime, I take care that no more of the second acid is used than is required to dissolve the calcareous part only of the said magnesian lime. To insure this I add the second acid in successive portions, and after every such addition I ascertain by an experiment on a small sample of the mixture whether the undissolved part be soluble or nearly soluble in a sufficient quantity of dilute sulphuric acid. As soon as this solubility is attained I discontinue adding more of the second acid to the mixture from which the sample was taken, and after decanting the fluid part I wash the sediment repeatedly with water, and then apply either dilute sulphuric acid or sulphate of iron, proceeding for the rest of the process as already mentioned.

I occasionally effect the separation of the lime from the magnesia, which together constitute magnesian lime, in the following manner : I first completely saturate any quantity either of the acetous, nitric, or muriatic acids (the two last being diluted respectively with from ten to twenty times their weight of water) by adding thereto

either a sufficient quantity of pulverized magnesian limestone, or such a quantity of hydrate of magnesian lime, as is barely sufficient for the purpose. I next precipitate the magnesia from the compound solution of lime and magnesia thus obtained, by adding either as much hydrate of common lime, finely sifted, as I have learnt by an experiment made for the purpose, is sufficient to saturate one-half only of the acid which the whole of the said solution contains, or by adding as much hydrate of magnesian lime as is sufficient to saturate the whole of the acid which the said solution holds in combination. In either case, I stir the materials together for at least half an hour, and I then allow the liquor to clear itself by standing. When cleared I decant the fluid, and wash the undissolved part repeatedly with water, and I afterwards apply the said undissolved part to the manufacture of sulphate of magnesia, by adding thereto either dilute sulphuric acid or sulphate of iron, in the manner before mentioned. In general the magnesian lime contains in every ten parts about five parts by weight of carbonic acid, three parts of lime, and two of magnesia, with small portions of aluminous earth and metallic oxides, and consequently the caustic magnesian lime consists in every ten parts of about six parts of lime and four of magnesia. In this case, the acid employed to saturate the magnesian lime is almost equally divided between these two earths, and therefore to dissolve only the calcareous earth, half the quantity of acid must be used which would be required to dissolve the whole of any given quantity of the said magnesian lime. But for any variety of magnesian lime containing in ten parts more than six parts, by weight, of lime, a proportionally greater quantity of any of the said acids must be used to take out the lime: and for any variety of magnesian lime containing in ten parts less than six parts of lime, a proportionally less quantity of acid will suffice to take out the lime. The precise quantities to be employed in these cases will be readily ascertained, experimentally, by any person who is even moderately versed in the management of chemical processes. We have given this detailed account of Dr. Henry's invention, in order to show how fully he investigated the subject, and also anticipated much which other manufacturers have re-discovered.

Mr. Gregson's process (dated Dec. 23, 1840) for manufacturing Epsom salt by acting upon calcined magnesian limestone with sulphate of iron, is as follows: In a retort resembling a gas retort, and set in a furnace in the same manner, about 100 lbs. of magnesian limestone are introduced, and kept at a low red heat for two or three hours, or until it ceases to give off carbonic acid gas, after which it is removed from the retort and allowed to cool. It is then stirred in an iron boiler, in which 100 lbs. of crystallized sulphate of iron has been dissolved in three or four times its weight of water, and allowed to boil for an hour, when, by the reaction of the materials on one another, sulphate of magnesia and oxide of iron are obtained.

In his patent of September 24, 1841, Mr. H. L. Pattinson states that he prepares sulphate of magnesia by neutralizing the solution of bicarbonate of magnesia, obtained from magnesian limestone by his patent process, with sulphuric acid, boiling down and crystallizing; or he mixes the solution with its equivalent quantity of sulphate of iron, dissolved in water, heated to the boiling point, and then suffers the precipitated carbonate of iron to subside, after which he decants off the clear solution of sulphate of magnesia, boils down, and crystallizes as before.

Mr. Gregson's improvements (patent dated February 10, 1845) in the manufacture of Epsom salts, consist, 1st, in the application of sulphuric acid to dolomite or magnesian limestone in the uncalcined state; and 2ndly, in the application of muriate of ammonia to remove the lime from the mixed hydrates of lime and magnesia obtained by thoroughly calcining and slaking dolomite. The following is the mode of carrying out the first improvement:—The dolomite is reduced to powder and made into a paste with water, in an open vessel lined with lead; then sulphuric acid of 1.500 specific gravity is added in the proportion of 350 lbs. of the latter to 200 lbs. of the former, and the mixture is well stirred. The sulphuric acid readily decomposes the dolomite, and carbonic acid gas is liberated; and when the effervescence ceases a solid substance remains, composed of the sulphates of lime and magnesia. If desired, the carbonic acid gas may be collected for use, by mixing the sulphuric acid and dolomite in a closed vessel. The mixed sulphates are separated by diffusing the solid residuum in water, allowing the sulphate of lime to subside, and drawing off the supernatant liquid, which is a solution of sulphate of magnesia, containing a small quantity of sulphate of iron. This solution is freed from sulphate of iron by means of caustic lime or magnesia, and is evaporated and crystallized in

the usual way ; or the mixed sulphates may be calcined in a reverberatory furnace for three or four hours, or until the whole of the iron is peroxidized ; and when this has been done, the sulphate of magnesia may be dissolved out of the mass, and the clear solution evaporated and crystallized.

The method of operating according to the second improvement, is as follows :— 200 lbs. of muriate of ammonia are dissolved in 100 gallons of water, in an iron boiler by the application of heat, and the solution is allowed to cool ; after which 200 lbs. of thoroughly calcined dolomite are slaked with water, and put into an iron still (holding from 300 to 400 gallons) connected with a Woulfe's apparatus containing water ; the solution of muriate of ammonia is then introduced, and a gentle heat applied to expel the ammonia, which is condensed in the Woulfe's apparatus. When all the ammonia has come over, the residuum is withdrawn from the still, and the hydrate of magnesia thoroughly washed, to free it from muriate of lime. The magnesia is then saturated with sulphuric acid, the iron it contains is thrown down by means of caustic lime or magnesia, and the clear solution is evaporated and crystallized.

Mr. Gregson employs this process in combination with the manufacture of precipitated chalk, and it will be necessary to describe the mode by which this is effected in order to give a proper view of the process as regards its economy in a commercial point of view. His first method of manufacturing precipitated chalk is as follows:—100 lbs. of muriate of ammonia are dissolved in 100 gallons of water, and the solution allowed to cool ; 70 lbs. of well burnt lime are then slaked in water, and when cold, stirred into the solution of muriate of ammonia in an earthenware vessel ; mutual decomposition immediately takes place, and muriate of lime and caustic ammonia are formed in the liquid. This solution is transferred to a cylindrical vessel, lined with lead, and containing an agitator covered with lead ; carbonic acid gas is then forced into the solution by means of a force-pump connected with the bottom of the vessel, and the agitator is kept revolving until the solution is entirely decomposed, which may be known by the smell of ammonia no longer arising. The vessel will now contain a milky fluid, composed of carbonate of lime and a solution of muriate of ammonia ; this fluid is removed and allowed to settle. The clear solution of muriate of ammonia is then decanted off, and the precipitated chalk well washed and dried. The solution of muriate of ammonia may be again used.

The second method is as follows:—100 gallons of a solution of caustic ammonia, specific gravity .970, are introduced into a vessel similar to that last described, and capable of holding 120 gallons; carbonic acid gas is then forced in, and the solution becomes thereby converted into a solution of bicarbonate of ammonia, which is run into a cistern containing 100 gallons of a solution of caustic ammonia of the same specific gravity; and a solutiou of carbonate of ammonia, of specific gravity 1.050 is thus produced. This is mixed with a solution of muriate of lime, specific gravity 1.200, in the proportion of two parts of the former to one of the latter; decomposition immediately takes place, and the whole becomes a gelatinous mass, which must be stirred until the carbonate of lime assumes the solid form. The mass is then allowed to subside, the clear solution of muriate of ammonia is drawn off, and the carbonate of lime is washed and dried.

Mr. Grisenthwaite patented, August 11, 1828, a process for making Epsom salt. He claims the manufacture of this salt by mixing together magnesia, sulphate of lime, carbonic acid, and water, which he says will form sulphate of magnesia. The magnesia is to be obtained either by precipitation from sea water or from magnesian limestone.

TRADE IN CINCHONA BARK IN BOLIVIA.

BY DR. H. A. WEDDELL.

A SOURCE of wealth in the department of La Paz, quite as abundant as its mines, is the trade in Cinchona bark. The immense importance that the traffic in this production has acquired in Bolivia, is a sufficient reason why I should briefly claim the attention of my readers to the subject, especially as during my last residence at La Paz, Cinchona bark was the chief subject of all conversation, in consequence of the differences arising between the bark-cutters or *cascarilleros*, and the company

which had obtained from the government the privilege of exporting this precious bark. It is on this point principally that I will make some remarks.

As has been stated by M. de Humboldt, it was not until about the year 1776 that the Cinchona barks of Lower Peru were offered in the markets of Europe. Up to that period these markets were supplied almost exclusively at the expense of the forests of Loxa: the barks from New Granada appeared about the same time; but it was not until much later that the Cinchona barks of Bolivia, or Higher Peru, entered into the competition—a competition which became formidable since by the discovery in 1820 of quinine, the febrifuge principle *par excellence* of the drug, it became manifest that the *Calisaya bark* far surpassed in richness all other species known. The forests of certain parts of Bolivia are in fact the only spots where nature has produced in some abundance the tree which affords this superior bark; and in this respect the department of La Paz is particularly favoured.

Shortly after the period I have mentioned, the influx of *cascarilleros* into the forests became so considerable, that in a short time there hardly remained a Cinchona tree in the neighbourhood of the inhabited districts, and the exports increased so much that the drug fell to a low price. The government of the day took, however, no steps to remedy such a state of things, and they consequently remained in the same position until about the year 1830. At that period the administration of General Santa Cruz, judging that it had become absolutely necessary to take some measures to prevent the exhaustion of so precious a source of wealth, formed the idea of prohibiting a free traffic in the bark, and of limiting to a certain amount the quantity which should thenceforth be collected in the forests and exported from the republic; but the means employed not having produced the expected result, it was decided that the exclusive right of exportation should be ceded to a national company. In November, 1834, the congress decreed a law on the subject, but it still proved ineffectual.

The free collection of the bark having then re-taken its destructive course, a new decree was requisite to suspend it. The cutting of Cinchona was consequently prohibited for five years, but long before the expiration of this term, the decree was repealed, and in its stead an export duty of from 12 to 20 *piastres* per quintal was levied.

In 1841, General Ballivian attained to power, but he introduced into the trade in barks no important change, until, in the year 1844, the legislative congress authorised the government itself to negotiate the capital necessary for the creation of a national bank which should purchase and export all the Cinchona bark produced in the country, paying for it at a rate to be fixed by itself (the bank), and which should bear a relation, said the law, to the funds which it (the bank) might have at its disposal, and to the interests of the *cascarilleros*.

The capital, however, for this operation not having been forthcoming, the administration of Ballivian offered shortly afterwards to the highest bidder the exclusive privilege of exporting the Cinchona bark of the republic, limiting the contract to a duration of two years. No one, however, offered to accept it.

The year following (1845) the basis of the agreement offered by the government was modified, and the *monopoly* finally adjudicated to Messrs. Jorge Tesanos Pinto and Co., for the annual sum of 119,000 piastres, and for a period of five years, during which the annual export might not exceed four thousand quintals, or during the whole time, 20,000 quintals, or 2,000,000 pounds.

It appears that the congress of 1846, to which Ballivian submitted the plan adopted by his government, gave it its approbation, but the low price at which the company purchased the barks of those who, with immense toil had collected them in the depths of the forests, rendered it very unpopular, and it ceased not, from the time of its foundation, to excite public complaint, until at last a decree of General Belzu, dated 17th March, 1849, put an end to its existence. Happily for the company, its coffers had already been long since filled.

Unrestricted trade with a duty of twenty piastres per quintal was immediately re-established, until a new company could be formed upon the conditions laid down in the laws of 1834 and 1844, which indeed had been attempted, but with no greater success than on the first occasion. Recourse was then again had to the public, and the offers of Messrs. Aramayo, Brothers and Co., towards the end of the year 1849, were accepted.

The new society, whose operations commenced on the 1st of April, 1850, was to

pay to the government the yearly sum of 142,000 piastres for the right of exporting annually 7000 quintals of barks, binding itself to purchase the said barks of any one offering them; the large bark or *Calisaya tabla* at the rate of 60 piastres per quintal, and the thin or rolled barks, known as *Charque* and *Canuto*, at the rate of 36 or 30 piastres per quintal of 100 Spanish pounds.

But the Pinto Company paid for the *Tabla* but from eighteen to twenty-two piastres, and for the *Canuto* from eight to ten piastres per quintal. One may judge then under what favourable auspices the new monopolists commenced operations; but the harmony was not to last long. The advantageous conditions which were offered to the *cascarilleros*, so different from those to which they had been accustomed, induced so great a number to engage in collecting the bark, that before the termination of the first year there had arrived at La Paz more than 20,000 quintals; that is, twice as much as the Company had engaged and was prepared to purchase in the period, and as much as the Pinto Company would have exported in five years. Affairs then took another aspect. Upon the occurrence of this fresh crisis, which ought long previously to have been foreseen, the government at once concluded that it was its duty to sustain the monopoly, and consequently lent its support to the various measures suggested to it for this end. It enacted, in particular, that all barks obtained from the forests should be immediately deposited in the Company's warehouses, under guarantee of being purchased by it as soon as it required them. It then prohibited bark-cutting in all forests of the republic for four years.

The first of these decrees was intended to put a stop to contraband trade, which, though far less easy than one might have supposed, was, nevertheless, practicable. It exasperated particularly the inhabitants of La Paz.

The second decree, which attacked more especially the interests of the inhabitants of the towns of the interior, who still had a considerable number of workmen in the forests, was received by them with the same disfavour; and the complaints becoming general, the feeble President was driven to make, to the prejudice of the monopoly, several concessions which preluded its fall. In fact, the extraordinary congress, which assembled at La Paz during our abode there, having decided that the executive power had exceeded its functions in making with the firm of Aramayo the agreement in question, annulled the contract.

At this period the *Banco Aramayo* had purchased 14,000 quintals of barks, and had proposed to take 14,000 quintals in addition (making the lots of the *two* following years), one-third of the amount of which was to be paid in ready money, and the remainder by bills; but all the merchants were not willing to agree to this arrangement, and a new company, which offered to pay for the goods with ready money, having offered itself and having been accepted, the sales effected on credit by the old firm were immediately annulled. On my departure from La Paz the new Company had just been constituted under the title of Pedro Blaye and Co., and as it had engaged to purchase, on almost the same conditions as the Aramayo Company, all the *Calisaya* barks then on sale, whether at La Paz or at Cochabamba, as well as those which might be collected in the forests before the termination of the year 1851, it was feared that the markets might become overstocked, and that the price of the precious drug might fall to such an extent that neither one nor other of the *bancos* would come out of the affair with profit.*

In the two years which had then expired, the forests alone of Bolivia had produced more than three millions of pounds of Cinchona bark! Such was the result of the sudden rise which took place in the price of barks, in consequence of the fall of the Pinto monopoly.

It was not, however, the poor *cascarilleros*, miserable labourers who, at the expense of vast toil, had dragged from the midst of the forests the much sought-for bark; it was not they, I say, who generally profited by the change, but far rather was it their wealthy employers. It is this that makes one the more regret the ravages committed in the forests of this region, and of which I will mention one instance.

I have said that the bark called *Quinquina tabla*, that is the large bark of the trunk of the tree, was paid for at the rate of sixty piastres, and that the *Charque*

* The firm of Blaye and Co. has fallen in its turn, and I have learnt that the government has decided to conduct itself the export of the barks which remained in the warehouses, paying for them at the same rates that would have been given by the companies.

or *Charquesillo*,* and the *canuto* or thinner barks obtained from the loftier parts of the tree, realized scarcely the half of this sum. What was the result of this difference in price? It was, that in many places *all* the smaller bark, which was difficult to peel, had been abandoned, and nothing taken from the felled tree but the *large* bark. In the newly discovered Cinchona forests of Cochabamba I have been assured that in order not to have the trouble of felling a tree, they frequently were content to strip off the bark merely to the height that the hand could easily reach; and that if a tree was cut down, the *cascarilleros* would neglect to remove all that bark which lay next the earth, in order to avoid the trouble of turning the trunk.

Whatever may be said, the forests of Bolivia, rich as they are, cannot long resist continued attacks of the kind to which they have been recently subjected. Those who in Europe think they see enormous and ever-growing masses of *Cinchona*, may well imagine a perpetual abundance. But he who seeks in the localities where the *Cinchona* is produced, to ascertain how much of it exists, is compelled to form another opinion. The single fact will effectually show the constantly progressive diminution of the Cinchona,† namely, that formerly it was everywhere to be met with in the neighbourhoods of the inhabited places of the region, whereas now, to find a tree of some *decimetres* diameter, one must generally make a journey of several days into the recesses of the forests. But unless these forests be interminable, which they are not, or the trees that are felled be replaced by others, which unfortunately is very rarely the case, how can a traffic, conducted like that of which I have spoken, be carried on for an indefinite period? By all evidence it is plain that the Calisaya bark, if continued to be collected in this manner, will, sooner or later, more or less completely disappear from our markets (unless, however, the government attends to its reproduction), and the commoner species of *Cinchona* which will replace it, will, in their turn, doubtless share the same fate.

Before the misfortune which I foresee, arrive (and it will not be in our day), science will perhaps have made the conquest of some new remedy which will render the loss of Peruvian bark less to be regretted.

Cinchona bark is packed for exportation in fresh ox-hides, after having been previously sewed up in bags of coarse cloth, which, at La Paz, contain six *arrobas* five pounds. The bale or seron complete, weighing about six *arrobas* fifteen pounds, forms half a mule-load. The entire load, therefore, a little exceeds thirteen *arrobas*, the transport of which to the coast costs, on an average, ten piastres.—*Voyage dans le Nord de la Bolivie.* Paris. 1853. Chap. xiii.

ON THE OXIDATION OF AMMONIA IN THE HUMAN BODY.

BY H. BENCE JONES, M.D., F.R.S.,
Physician to St. George's Hospital.

(*From the Proceedings of the Royal Society, June 15th*, 1854.)

In the last edition of Professor Lehmann's *Animal Chemistry*, vol. ii., p. 363, a very decided opinion is expressed against the conclusion to which I arrived, in consequence of some experiments published in the *Philosophical Transactions* for 1851.

I considered it proved that ammonia was partly at least converted into nitrous acid in its passage through the body. In opposition to this Professor Lehmann states,—

1st. That the method which I employed must of necessity give a reaction resembling that given by nitrous acid; his words are, "Es wäre nun leicht einzusehen dass schweflige Säure, durch welche bekanntlich Iodwasserstoff zersetzt wird, in die Vorlage übergeht und so jene vermeintliche Salpetersäure Reaction bedingt."

2ndly. That when nitric acid was added to urine, and it was distilled with phosphoric acid instead of sulphuric acid, no trace of blue colour with starch and iodide of potassium could be obtained. "Das nach Anwendung von Phosphorsäure erhaltene Destillat giebt aber auch jene vermeintliche Salpetersäure Reaction nicht,

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* *Charque* is the name applied in Spanish America to *dried meat*, which has generally the form of thin slices. It is to this that they compare the thin Cinchona barks which have dried without rolling up. The word *charquesillo* is a diminutive of *charque*.

† I speak here of *Cinchona Calisaya* only, for several other species are still very common.

ja selbst dann nicht, wenn dem Harn vorher absichtlich einige Tropfen Salpetersäure zugesetzt worden waren."

It appeared to me undesirable merely to reply to Professor Lehmann, that I had expressly stated that the indigo and protosulphate of iron tests were used, and gave as decided proof of the presence of nitrous acid in the urine as Price's test gave; and that sulphurous acid could not have produced the same effect as nitrous acid in these tests. It seemed more desirable to repeat the experiments which had been made in Professor Lehmann's laboratory on the action of sulphurous acid, and on the effect of using phosphoric instead of sulphuric acid in the distillation of the urine.

I was fortunate enough to obtain the assistance of Mr. Malone to carry on the experiments continuously from day to day, and through the kindness of Dr. Hofmann this was done in the College of Chemistry.

1st. On the action of sulphurous acid on starch and iodide of potassium and very dilute hydrochloric acid.

In England it is by no means well known that sulphurous acid decomposes hydriodic acid. On the contrary, theoretically it should not liberate iodine, and experimentally not only does it not liberate iodine, but it hinders the liberation of iodine and stops the formation of the blue colour when Price's test is used and nitrous acid is present; and if sulphurous acid be added after the blue colour is formed it makes it disappear.

Pure sulphurous acid was prepared, some nitre was fused, and a dilute solution was made, and it was tested by Price's test (starch, iodide of potassium, and very dilute hydrochloric acid), then the dilute nitre solution immediately gave the deep blue iodide of starch; but when much or little sulphurous acid was added previously to the nitre solution, no blue colour at all was produced; and when, instead of the nitre solution, much or little sulphurous acid alone was added, contrary to the statement of Lehmann, no decomposition of the hydriodic acid could be obtained.

If the iodide of potassium, instead of being pure, was mixed with iodate of potassa, an immediate blue colour was of course observed. I can only suppose that in this way Professor Lehmann obtained the reaction which he has attributed wrongly to the action of sulphurous acid on hydriodic acid, unless indeed no sulphurous acid at all was present and the acidity of the distillate was unneutralized. Dr. Lehmann is, however, right as well as wrong, in saying that Price's test for nitric acid fails when sulphurous acid is present. The test fails, not, as he says, because sulphurous acid has the same action as nitrous acid in liberating iodine, but because it has exactly the opposite property of hindering the iodide from being set free even when nitrous acid in small quantity is present.

It is possible that in distilling the urine with sulphuric acid, the distillation, if carried too far, may give rise to sulphurous acid, and that thus Price's test may fail to detect nitrous acid in the urine. Moreover, portions of the distillate may be projected against the sides of the hot retort, by which the sulphuric acid acting on the organic matter may be decomposed, and minute quantities of sulphurous acid may be liberated. This sulphurous acid, instead of decomposing hydriodic acid, causes the reformation of hydriodic acid when nitrous acid liberates iodine in Price's test.

2ndly. Lehmann states that experiments were made by distilling urine to which a few drops of nitric acid were added with phosphoric acid, and that then the distillate gave no reaction with Price's test.

The following experiments were made with every precaution :—

Anhydrous phosphoric acid was prepared, and it was found to be free from nitrous acid. Some healthy urine was taken and some pure nitrate of potassa, in the proportion of two grains of salt to an ounce of fluid, and distilled with phosphoric acid (ten ounces of urine, twenty grains of nitre, and one ounce of anhydrous phosphoric acid). On concentrating the neutralized distillate, nitrous acid was detected by all the tests, namely, the indigo test, the protosulphate of iron and Price's test.

In a second experiment, five ounces of urine with five grains of nitre and half an ounce of anhydrous phosphoric acid, gave nitrous acid by all the tests. The distillation was continued until the contents of the retort were viscid.

In a third experiment, three ounces of urine with a grain and a half of nitre were distilled with three drachms of glacial phosphoric acid; the distillate neutralized and evaporated gave no trace of nitrous acid; the same urine with the same

quantity of nitre and three drachms of sulphuric acid, when distilled, gave a distillate, which when neutralized and evaporated gave decided evidence of nitrous acid.

In my former paper I showed that by distilling with sulphuric acid when only one-tenth of a grain of nitre was added to each ounce of urine, nitrous acid could be detected.

From these experiments it appears that distillation with sulphuric acid is to be preferred to distillation with phosphoric acid; but even with this last acid, when a grain of nitre is added to an ounce of urine, the nitrous acid can be detected.

I then endeavoured, by using phosphoric instead of sulphuric acid in distilling urine passed after a salt of ammonia had been taken into the stomach, to detect nitrous acid in the urine.

Two drachms of muriate of ammonia were taken in seven ounces of distilled water. The urine was collected for six hours afterwards. Twelve ounces of this urine were distilled with one ounce of phosphoric acid (anhydrous). The distillate, when concentrated, did not give any evidence of nitrous acid by Price's test.

The same experiment was repeated with no better result.

In another experiment, sulphuric acid, six drachms to twelve ounces of urine, was used instead of phosphoric acid. The distillate as soon as it was obtained gave the slightest precipitate with chloride of barium insoluble in nitric acid, showing that a trace of sulphuric acid was carried over into the receiver. The distillate was made alkaline with pure carbonate of soda, evaporated, and nitrous acid was immediately detected by the indigo and iron test, as well as by Price's test. A portion of the distillate left exposed to the air, on the following day had lost the power of liberating iodine. This arose from the nitrous acid passing into nitric acid.

Pure nitre gives no colour with starch, iodide of potassium, and dilute hydrochloric acid, but when fused it produces the liberation of iodine immediately. If the solution of fused nitre is exposed to the air it loses this property, but regains it when the solution is evaporated to dryness and refused and again dissolved.

In another experiment six ounces of urine, passed before the muriate of ammonia was taken, were distilled with half an ounce of sulphuric acid, the distillate was highly acid, and gave a slight precipitate with chloride of barium; it was made slightly alkaline, evaporated to a small residue, and then gave no evidence of nitrous acid. Then two drachms of muriate of ammonia were taken in seven ounces of distilled water, eight ounces of urine passed four hours afterwards were distilled with half an ounce of sulphuric acid. The distillate was fractional; the first portion gave no colour with starch test; it contained a minute trace of sulphurous acid. The second portion was highly acid; it was made slightly alkaline, evaporated nearly to dryness, and then gave most positive evidence of nitrous acid by Price's test, and also by decolourizing a deep solution of indigo.

Thus before the salt of ammonia was taken no nitrous acid could be detected in the urine, whilst after the ammonia nitrous acid was proved to be present, not only by Price's test, but by the indigo test also.

In conclusion, it results from these experiments:—1st. That in Price's test sulphurous acid produces exactly the opposite effect to nitrous acid, and even hinders nitrous acid from liberating iodine from hydriodic acid.

2ndly. That phosphoric acid, when mixed with urine containing nitre and distilled very low, does liberate nitrous acid; though when used instead of sulphuric acid, it does not enable the nitrous acid to be detected so readily as when the latter acid is employed.

Hence the experiments performed in Professor Lehmann's laboratory by Herr Jaffé* do not invalidate Price's test for nitrous acid in the way Professor Lehmann supposes; and by again repeating some of my former experiments, I still arrive at the conclusion that when ammonia is taken into the body nitric acid may be detected in the urine, but that the quantity which can be made to appear is so small that the most delicate method is required for its detection. This, however, is no proof that a much larger quantity may not be lost in the process for obtaining it from the urine.

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* Erdmann's Journal, vol. lix., p. 238, 1853.

ON A NEW PROCESS FOR PREPARING POWDER OF IRON.

BY ARTHUR MORGAN, L.A.C.,
Apothecary to Sir Patrick Dun's Hospital.

This preparation, known also as the "Fer Reduit," or Quevenne's iron, from the name of the gentleman who introduced it, has obtained a place both in the last Dublin Pharmacopœia and in that of the United States. On the continent and in America, practitioners speak highly of its effects as a chalybeate and tonic; in this country, its use has not been sufficiently extensive as yet to justify a decided opinion. I may mention, however, that in several cases in which it has been lately used at Sir Patrick Dun's Hospital, its good effects were well marked.

In the formulæ which have been published in the two Pharmacopœias already mentioned, the process is difficult and uncertain; it consists of passing a stream of hydrogen gas over oxide of iron heated to redness in an iron tube. The chief difficulty consists in regulating the heat, for if the heat is not sufficiently high, the product will be a pyrophorus, taking fire immediately on exposure to the air; and on the other hand, if the heat be too high, the powder will become agglutinated. These difficulties cause this preparation to fetch a high price, and afford temptations to the substitution of spurious imitations.

By the process which I propose, these difficulties are overcome, and an opportunity will be afforded of determining by extensive use whether the remedial effects of this preparation justify its addition to our already over-stocked Materia Medica.

To prepare powder of iron according to my plan, the steps to be pursued are as follows:—

Eight ounces of yellow prussiate of potash are to be heated in an oven till the water of crystallization is driven off, reduced to a very fine powder, then thoroughly mixed with four ounces of red oxide of iron (previously well washed and finely pulverized) and three ounces of pure dried carbonate of potash. This mixture is then to be introduced (a small portion at a time) into a crucible previously heated to low redness. The heat must be kept up till all appearance of effervescence has ceased. The crucible is then allowed to cool, the mass scooped out, powdered, and having been introduced into a large bottle, repeatedly washed by agitation and decantation with distilled water, till the washings cease to precipitate with solution of nitrate of silver. The powder is then to be turned out on a filter, and dried as rapidly and with as little exposure to air as possible. It may now, if necessary, be passed through a fine sieve to separate any particles which may have agglutinated, owing to the application of too high a heat. The powder should be preserved in a well-stopped bottle. With this process and the quantities mentioned, the product obtained will weigh about three ounces and a half.

As thus obtained, the reduced iron is a fine powder, of a dark grey colour, not feeling gritty or coarse under the fingers; it dissolves completely in muriatic acid with considerable effervescence, and the solution thus obtained yields with potash or ammonia the greenish gelatinous precipitate indicative of a protosalt. If the precipitate be reddish, it shows the powder to contain oxide of iron. Water digested on the powder should not precipitate with solution of nitrate of silver; that would indicate that all the cyanide of potassium had not been washed out.

The chemical decompositions which take place in this process I believe to be as follows:—Two atoms of ferrocyanide of potassium 2 (2 K Cy+Fe Cy), and two atoms of carbonate of potash 2 (KO, CO_2), being fused together yield five atoms of cyanide of potassium 5 (K, Cy), one atom of cyanate of potash (K O+Cy O), two atoms of metallic iron, and two atoms of carbonic acid gas, which are given off in effervescence. The five atoms of cyanide of potassium thus formed now acting on three atoms and one-third of the peroxide of iron, decompose the peroxide, giving rise to five atoms of cyanate of potash 5 (KO, CyO), and setting free the iron in a finely divided condition, thus we obtain all the iron contained in the materials used, both that of the ferrocyanide and that of the peroxide.

The proportions in the process detailed above do not exactly agree with the atomic quantities just mentioned. According to the above explanation, the quantity of peroxide of iron required should be 2144 grains instead of four ounces, or 1750 grains, directed to be used. But as Wittstein has remarked (in speaking of Liebig's process for obtaining the mixed cyanide of potassium and cyanate of potash, by fusing ferrocyanide of potassium and carbonate of potash together in the propor-

tions adopted in the process which has been detailed) that some of the cyanide is decomposed during the exposure to heat, the product instead of being five atoms of cyanide of potassium to one atom of cyanate of potash, as by theory should be the result, consists of cyanide and cyanate in the proportion of seven of the former to five of the latter; it was therefore necessary to allow for this decomposition, and also further to reduce the amount of oxide used, so as to maintain a considerable excess of cyanide of potassium to protect the metal already reduced from oxidation by exposure to the heat and air.

This process, affording an easy and certain method of preparing an article which promises to be of some value as a therapeutic agent, and of obviating the use of a difficult and uncertain procedure, I have been induced to make known in the hopes that it may turn out of some value to the pharmaceutic chemist.—*Dublin Medical Press.*

NOTE ON TURF PAPER.

Since the publication of the article upon the manufacture of paper from peat, in No. VI. of this Journal, and *Pharmaceutical Journal*, vol. xiv., page 69, we have learned that a patent for a very similar process to that there described, has been granted for these countries to Mr. W. H. Clarke, of London. As the invention is stated in the specification to be a "communication," we presume it has been introduced either from Italy or France, and perhaps from the very localities which we have mentioned in the paper alluded to. The specification states that peat which has not undergone too great a decomposition or decay, and in which the fibrous and ligneous parts have consequently preserved a certain tenacity of texture, is to be washed with water, so as to remove sand and earth, the turf, if dry, having been first pulverised. This washing, or rather eleutriation, is not considered to be necessary when *papier mâchie* or *carton-pierre* are to be made. The clean vegetable matter, before being reduced to pulp, is first soaked during a couple of days in a solution of about six parts, by weight, of potash (soda would answer equally well), and six of fresh slaked lime, in one hundred of water. When fully digested, the vegetable fibre is separated from the alkaline lye by washing, and is then submitted to the action of water moderately acidulated with muriatic acid during twenty-four hours, after which it is bleached and reduced to the condition of pulp by the ordinary means.

This process is identical with that of M. Lallemand, described in our former article. It is probable that the centrifugal machine, on the principle of that employed in sugar factories, might be advantageously employed in the purification of turf fibre, especially in the removal of the lye of soda, and that a far more perfect and rapid bleaching might be effected by means of a mixture of Epsom salt and bleaching powder, which would produce sulphate of lime and chloride of magnesia. This was one of the first bleaching compounds proposed, and was again employed by Clausen for bleaching flax cotton. Its use can only be determined by its cost. If Epsom salt can be had cheaply, and that the waste magnesia could be economized, there can be no doubt that the bleaching of such dark coloured fibres would be much more easily effected than with ordinary bleaching powder.

It appears that Lieut.-Col. Dickson, of Croom Castle, in the county of Limerick, has taken up this patent, and, in conjunction with Mr. Clarke, is erecting experimental works at Clonlahard and Tarbert, in the County of Kerry, where it is proposed to prepare materials for making paper, *papier mâchie*, *carton-pierre*, &c. We wish the project every success, and hope that it will not meet with the fate of the many other really feasible and valuable manufactures which have been from time to time attempted here, but which have failed from ill management. At this moment the success of such a manufacture is of national interest, for independent of the importance of utilizing peat, its employment to a large extent in the manufacture of the low qualities of paper, would go far to remedy the great scarcity of rags which now presses so heavily upon the paper trade.—*Journal of Industrial Progress, Dublin.*

PARIS EXHIBITION OF 1855.

BRIEF SUMMARY OF THE CONDITIONS UPON WHICH THE EXHIBITION WILL BE CONDUCTED.

The decrees and regulations issued by the Imperial Commission of France give full information as to the principles upon which the Imperial Government propose to conduct the Exhibition of 1855, and an attentive perusal of them is recommended to all those who desire to co-operate in securing a fair representation of British industry on that occasion.

Those regulations appear to be conceived in the most equitable and liberal spirit; and there is no doubt that that spirit will be met in a becoming manner by the manufacturers and other producers of the British Empire and her Colonies.

It may be useful to sum up briefly the principal conditions upon which the Exhibition will be conducted, comprising the assistance offered to exhibitors by the French Commission, and that which the British authorities are empowered to offer.

1. The Exhibition will open in Paris on the 1st May, 1855.
2. The French Commission will communicate only with exhibitors from foreign countries through the Commission appointed by each country for that purpose.
3. No articles will be admitted from foreign countries except with the sanction of such French Commission.
4. Every article produced or obtained by human industry, whether of Raw Materials, Machinery, Manufactures, or Fine Arts, is admissible, except—
   - I. Living animals and plants.
   - II. Substances liable to become putrid from keeping.
   - III. Detonating and other dangerous substances.
   - IV. Articles of extravagant size.
5. All goods must reach Paris between the 15th January and 15th March, 1855, which period may, in a few exceptional cases, be extended to the 15th April.
6. The French Commission offers to convey all goods from the French ports or frontiers to the building in Paris without charge.
7. No charge will be made for rent.
8. Exhibitors and their agents will be admitted free to the building during the whole period of the exhibition.
9. Plain counters and partitions will be provided without charge.
10. The French Commission will find labourers for unpacking, transporting, and arranging goods under the direction of exhibitors or their agents.
11. The French Commission will provide shafting, steam, or water-presses for machines in motion.
12. Exhibitors will be responsible for accidents, loss, or damage, but the fullest precautions are promised against such events.
13. The current trade price may be affixed to any goods if the exhibitors desire it.
14. Goods may be exhibited in bond, and no duty will be charged if re-exported.
15. Exhibited goods at present prohibited by the French tariff may be admitted for consumption in France at an *ad valorem* duty of 20 per cent.
16. Arrangements will be made to insure one year's protection to designs and inventions if exhibited, without cost to the exhibitor.
17. The goods will be examined by an international jury, and rewards given, the nature of which will be published.
18. The British authorities will undertake all expenses of general organization and management, and will defray the expenses of the transport and custom-house agency of all goods delivered within a specified time.
19. A sufficient staff will be provided for giving that attention to the goods of exhibitors which was undertaken by the Commissioners for the Exhibition of 1851.
20. The expenses, which must in every case fall upon exhibitors, will be—
   - I. The carriage of the goods from the manufactory or residence of the exhibitor to London.
   - II. The expense of glass-cases, shelves, brackets, awnings, hangings, or decorations of the stalls, which must all be undertaken under such restrictions as the officers of the French Commission may impose for the sake of the general arrangements or appearance of the Exhibition.

III. The unpacking, arrangement, and general care of the goods during the Exhibition, except as far as provided by paragraph 19.

21. Demands for space are to be sent in before the 1st of July, if possible, and in no case later than the 1st of August.

Forms of applications for space and other information may be had on application to the undersigned.

Department of Science and Art,
Marlborough House, Pall Mall, London,
28th May, 1854.

H. C. Owen, *Capt. R.E.*

THE QUININE PATENTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—Your last number contains a letter from Mr. Herring, in which are some insinuations upon my conduct in reference to our Hydrocarbon Patent for the manufacture of the *Vegetable Alkaloids*, which render some explanation necessary from me, to set matters fairly before the public in justice to myself.

He appears to insinuate that I have been guilty of unprofessional conduct, and have improperly used information which he had confidentially communicated to me, for the furtherance of my own private interests.

He has already had an explanation from me, but has unjustly withheld all this from the public (who really had nothing to do with the matter); but if he placed one circumstance prominently before them, he should in fairness have made them acquainted with the whole.

In August of 1853 I read a paper at the Bristol Microscopical Society, on the discovery of quinine and quinidine in the urine of patients, which was published in the *Philosophical Magazine* for September, and in your Journal for November, 1853. In this paper I made use of Stass's elegant ether process for the recovery of the alkaloids. My friend Mr. Thwaites was present at that meeting, and was much struck with the simplicity of the process, and shortly afterwards called upon me to say that he had used camphine for a similar purpose, and with equal success. He requested me to make some experiments for him upon the mode of using this solvent in the manufacture of *the various alkaloids* of commerce, and if I found the plan successful, to join him in patenting the process. The course of experiments naturally led to the employment of other solvents—turpentine, and fusel oil were soon found to be equally advantageous, and in the month of October we determined upon patenting the process, but it was not carried into effect until the 15th of November, when we provisionally specified.

Directly after the publication of this paper in the *Pharmaceutical Journal*, Mr. Herring took offence at my character of his hospital quinine therein expressed, and called on me to analyse his patent white sulphate, in order that this article should not be improperly condemned by the public mistaking the two. His letter is dated the 2nd of November, 1853, and he referred me to the *Pharmaceutical Journal* of that month for his process. He gave me no private information on the matter, and did not even ask my opinion upon it. All I knew of his process was contained in your periodical, yet he appears to insinuate that he consulted me professionally upon this matter in confidence, and that I have committed a breach of this confidence in patenting an infringement of the process thus entrusted to me.

Now permit me to show that turpentine was not employed by him in the sketch of the process therein published. Benzole is the only solvent named.

Allow me also to point out the real differences between his patent and that of Thwaites and Herapath, for hitherto they have been overlooked both by Mr. Herring and by yourself, Mr. Editor. Our patent is a modification of Stass's elegant process, in which camphine, turpentine, fusel oil, or other hydrocarbon, is used instead of the solvent he employs, namely, ether, and is in substance as follows :—

The impure acid solution of the alkaloid, whatever it may be, is precipitated by some alkali or alkaline earth, *and to this mixture of alkaloid in suspension*, is added the solvent employed; they are agitated together, the lighter fluid containing the alkaloid only in solution, separates on repose, and is removed from the heavier fluid and impurities by decantation, or by the syphon. This solution of quinine or *other*

alkaloid in the hydrocarbon is then well agitated with any pure diluted acid, to which the *alkaloid* is transferred by elective affinity; repose again permits the two fluids to divide, and by decantation or the syphon, the heavier fluid is separated from the pure hydrocarbon, which may be again employed for the same purpose.

Herring's process is to dissolve the quinine (and be it remembered he only patents it *for this alkaloid*) "out of *the lime cake previously dried and powdered*, by means of turpentine or benzole, or other solvent of quinine, not a solvent of lime," and not at all in the way we employ the solvent.

His next process is similar to one of ours :—he agitates the turpentine or benzole solution of the quinine with an acid, and herein is the only similarity, and for this he is indebted to Pelletier.

With respect to the general plan of our process it is the same as that of the Edinburgh Pharmacopœia, modified somewhat in two respects. 1st, The use of the hydrocarbon process ; and, 2ndly, The decomposition of the red-coloured and carbonated alkaline liquids first formed, by the aid of chloride of calcium, &c., to extract any alkaloid which would otherwise be lost. This process is given by us as an example only—we do not claim it alone ; our claim is founded on the separation of the alkaloid by the assistance of the difference in the specific gravities of the solvent, and of the menstruum in which the alkaloid was previously held in suspension. Our patent is no infringement of his therefore; it differs from his in every step of the process but the one pointed out. We sometimes also employ turpentine as a solvent, but not in his method of using it, which does not differ from Pelletier's in the slightest degree. His alkali process is that of Badollier, modified by using caustic soda instead of potassa for the extraction of the colouring matter. His whole patent process is simply a combination of Badollier's process with that of Pelletier, with two alterations, the substitution of soda instead of potassa—and benzole as a solvent instead of turpentine, which latter solvent *does not appear* in his provisional specification, but was *an after-thought*, and introduced in his last specification for the first time on the 18th of December, 1853, about one month *after* we had provisionally specified the use of this solvent.

I remain, dear Sir, yours very obediently,

W. Bird Herapath, M.D.

32, *Old Market Street, Bristol, August* 16, 1854.

EARLY CLOSING ASSOCIATION.—MEETING OF CHEMISTS.

A Meeting of Chemists and Druggists was held on Tuesday, the 8th of August, at five o'clock, A.M., Mr. Whitmore, of Oxford Street, in the Chair, for the purpose of receiving and considering a plan proposed by Mr. Lilwall, Hon. Secretary of the above Association, for effecting a curtailment of the hours of business. The Meeting was respectably attended, but not so numerously as the former meeting, reported last month.

The Chairman commenced by a few remarks on the good cause on behalf of which they had assembled, and which he considered it his duty, in common with others, whether possessing much or little influence in the trade, to advocate and support. It was a stigma attached to Chemists and Druggists, that while every other class of the community had done something towards promoting the early closing movement, they had done literally nothing ; that while the highest dignitaries of the Church, the most influential noblemen in the land, the wealthy merchant, the philanthropist, and the man of letters, had all united in the noble cause of promoting the social comforts, and affording facilities for the intellectual improvement of shopkeepers, the Chemists and Druggists had taken no step whatever towards the moral and social elevation of those placed under their more immediate care and protection. The Chairman proceeded to notice the preliminary classical education of the Chemist, and the necessity for allowing young men time to study in order to apply that education to their professional pursuits. Since the meeting of last month, he had introduced the subject to the notice of many persons possessing considerable influence, and they had all evinced a disposition to promote the movement. If they would follow the advice of the Hon. Secretary of the Association, they might be assured that success would attend their efforts. He referred to the leading article in the *Pharmaceutical Journal* for August (page 49), and enlarged upon the respective

interests of the three classes of persons there alluded to, namely, principals, assistants, and the public, contending that it was the interest of all parties to curtail the hours of business. He felt assured that the young men desired the change, not for the purpose of entering into the dissipations of the metropolis, but in order to have the opportunity of improving their minds. Employers and the public would derive benefit from the superior qualifications of dispensing Assistants, who could not devote the needful attention to study if engaged at the counter till half-past ten or eleven at night. After a few remarks on the advantage of publicly discussing the subject, and urging upon the advocates of the cause to temper their proceedings with judgment, and with a spirit of conciliation, the Chairman called upon the Hon. Secretary, Mr. Lilwall, to lay before the Meeting his proposed plan.

The Hon. Secretary read his plan, which was to the following effect:—1st. To prepare a pamphlet containing a plain statement of the grievances endured by Chemists and Druggists' Assistants, demonstrating the needlessness of the late hour system, and the particular mode by which persons of all classes might contribute to its downfal. The pamphlet to contain individual cases of hardship and reports of the five o'clock meetings. 2ndly. To forward copies of the pamphlet to the public press generally, soliciting their advocacy. 3rdly. To forward copies of the pamphlet to the clergy and other ministers, with a circular, requesting them to introduce the subject to their congregations, especially with reference to the practice of keeping shops open on the Sabbath. 4thly. To call a meeting of the employers. 5thly. To form deputations to canvass the trade. 6thly. To convene a second meeting of employers to receive a report of the result. Mr. Lilwall explained in detail the utility and practicability of these several propositions. He stated that the Association had, in one day, no less than twelve sermons on the subject by clergymen of the Established Church, besides several by Dissenting ministers. He proceeded to prove that the opening of shops on Sunday is unnecessary, and read a list of articles purchased on Sunday at a first-class city house, and also after eight o'clock at night during the week, comprising pennyworths of pills, hair oil, scents, soda-water, Epsom salts, change for a £5 note, &c., which he contended were not so urgent as to require that shops should be open at unseasonable hours or on Sundays. It was proposed that some one should always be on the premises in case of emergency. If the shop were shut these needless articles would not be applied for. Opinions differed as to the hour of closing; some said eight, some nine. He decidedly advocated eight. Some Chemists said it would be useless to close at nine; and, in his opinion, unless they closed at eight, they might as well keep open till twelve, as they could not after nine attend meetings of Associations, &c. Employers would derive as much benefit as Assistants. He had read the remarks in the *Pharmaceutical Journal*, where it was said that there was a difference in different localities, but he was strongly of opinion that in no district should the hour be later than eight, and where it could be done earlier so much the better. He was prepared to show that the public were interested in the early closing movement, which he could prove, by citing mistakes and serious consequences resulting from the fact, that Assistants were not scientifically educated for want of time to study. He therefore considered the public as much interested in it as either employers or Assistants. Some shops which had been closed early had been patronized in consequence, and he had no doubt those Chemists who would set the example would meet with similar approbation from the public.

Mr. Alfred Chamberlain said he was in business in Brick Lane, St. Luke's. He had no Assistant. Sunday was one of his best days. Sometimes he sold from eighty to 100 pennyworths of hair oil on a Sunday; and if he did not serve these pennyworths of oil the parties would go elsewhere for their medicines. His neighbour kept his shop door tied open on Sunday; if he (Mr. C.) were to close his shop, he would ask what remedy there was for him, unless he sacrificed his business?

Mr. Lilwall, in reply, said the case was a most unfortunate one; he did not see how to meet such a case. If he kept no Assistant he must remain on the spot to attend to cases of emergency, but he would derive more satisfaction in the end from closing his shop at an early hour, and altogether on Sunday.

Mr. Burden moved the first resolution:—

"That this Meeting approves of the plan as proposed by the Honorary Secretary."

With regard to the hour of closing he was decidedly in favour of eight in preference to nine. Some customers were in the habit of coming late. Such

persons would continue to defer their purchases till the last moment, and would sometimes come a quarter or half an hour after the time of closing, whether that time were eight, ten, or eleven. Under the improved system, however, the Chemist would not be so likely to be called up from his bed to supply some trifling article. In answer to the remark that in some localities the general habits were late, he said, if the late habits of their neighbours were to be a stumbling-block, they would never succeed. Being convinced that they were doing right, they should set the example and take the consequences. He believed there would be no loss of customers by so doing. He warmly advocated a proper observance of the Sabbath. He had read the article in the *Pharmaceutical Journal* before referred to, and wished the Society had fourteen years ago acted on the principle there advocated, of allowing young men more time for study. He could not remember any similar passages during that period. He wished the objections in that article had been omitted, as they only tended to discourage, and most of them had been effectually answered by the practical success which had attended the career of the Early Closing Association. He hoped they would persevere, and let the public see that they could serve them as well with short hours as with long, if not better. He believed, if they would pursue their course without waiting for others to lead the way, they would have reason to look back with satisfaction to the five o'clock meetings.

Mr. Rouch seconded the resolution. He referred to the services of the Hon. Secretary and his Association, and to the half-holiday on Saturdays lately granted by the wholesale houses. He did not believe the masters would be losers by shortening the hours, but the reverse, and the character of the profession would be raised; requiring as it did a great amount of study, time and opportunity should be afforded. They had the public, the press, and the pulpit on their side; they only wanted the concurrence of the principals, and they could not fail to succeed.

The resolution was carried unanimously.

Mr. Webber moved, "That this meeting pledges itself both pecuniarily and by personal assistance to carry the foregoing plan into operation." After a brief allusion to the advantage of the movement both to principals and Assistants, he stated that he had been behind the scenes of the Association, and the exchequer was not so well filled as it ought to be. Without the sinews of war it was hopeless to expect victory. He appealed to those present for aid in support of the efforts of the Hon. Secretary, who had worked by day and by night for the purpose of lessening their hours of labour. It was estimated that about £40 would be required to defray the expenses of printing, &c. Supposing the number of Chemists' Assistants in London and the neighbourhood to be between 1600 and 1800, one shilling from each would yield double the amount required for the present exigency. It was not likely that all would contribute that amount, but he hoped some would give more than a shilling, and that none would refuse to give something, as the Assistants were the parties most interested in the result. In conclusion, he alluded to a tradesman in a large way of business, who had told him that many of his carriage customers had commended him for closing early, and told him he should lose nothing by it.

Mr. Symes seconded the resolution. As Treasurer, he alluded to the want of funds, and added a few remarks on the importance of the movement. The motion was put, and carried unanimously.

Mr. Lilwall reminded the Meeting that the Early Closing Association was dependent entirely on voluntary subscriptions, and that if the needful funds were not supplied, they must not hold him responsible for the failure of the undertaking.

Votes of thanks to the Chairman and to Mr. Lilwall having been passed, and a subscription opened, the Meeting separated.

APPEAL AGAINST LATE HOURS OF BUSINESS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As a Chemist's Assistant I felt particularly gratified on reading that so large and influential a body had met together to discuss the evils of the late hour system, and to endeavour to introduce measures for the amelioration of the trade at large. A meeting convened at so early and apparently so unseasonable an hour, to be so well attended and ably represented, shows, I think, a decided movement in the right direction, that employers, generally, begin to give the subject a proper consideration.

The present late hours of business cannot be considered but as a great social evil.

What need of the continual tax on the physical powers, and consequent enervating of the mental capacities to which the present long and laborious hours subject us? Business could be ably and conveniently executed in a much less time than it now is, and the hours could undoubtedly be abbreviated without injury to the principals, by emancipating them from the thraldom of an anxious and laborious calling, thus allowing them opportunities for mingling more freely in their own social spheres. Assistants would reap a benefit from the adoption of the early closing system, inasmuch that time would be afforded them for prosecuting their studies, and extending their knowledge of chemical science. And I do not hesitate in saying, that one great and desirable result which would be achieved by this movement, would be the decided improvement and enlarged qualifications of Chemists' Assistants generally. The Pharmaceutical Society would flourish and receive fresh additions of talent and energy now excluded, being debarred the opportunities of culture. For, I would ask, what incentive has science for the man whose powers, mental and physical, have been severely employed for fifteen or sixteen hours? What inducements has he then to burn the midnight oil and ponder over the glorious researches of the illustrious sons of Science? He has none. No man, however great his desire for improvement, or however strong his attachment to scientific pursuits, will be able to attain any advancement when the time only adaptable to his requirements is that which remains after his powers have become faded and exhausted with protracted and laborious application. Few have powers capable of such endurance, and still fewer would be desirous of exercising them under such circumstances.

I would therefore appeal to the principals generally, and beg to impress upon them that, in this age of social and mental progress, their co-operation is required to extend the benefits of these advancements, more especially to Chemists and Druggists. The power of unity is required for developing this benevolent scheme, and I would respectfully suggest, that if the gentlemen composing the Pharmaceutical Board would cause a circular to be issued to the Members of the Society, requesting their co-operation, or to state what impediments exist in their neighbourhoods to prevent the practical working of the Early Closing System, a great and speedy assistance would be rendered to those who are labouring to promote our interests. There are many, I am aware, who ndulge in vehement language upon this subject, and assimilate the present movement to an emancipation of "White Slaves;" but I must acknowledge that such extravagant expletives are seldom made use of by those upon whom the yoke presses most heavily. Without meriting many of the highly-drawn figures of speech which have been applied to it, the condition of the Chemist's Assistant presents ample scope for amelioration; and whilst soliciting the generous aid of the principals to strive and accelerate this movement, I would earnestly impress upon the minds of the Assistants, that by increased assiduity and attention to the interests of the employers, they will do much to secure their co-operation and to assist their own cause.

Others may take up the pen and wield it with more power, and with greater benefit to the cause, but none will with a greater desire that it may ultimately tend to the welfare of all concerned in this movement.

Soliciting your kind attention to these brief remarks,

I remain, Sir, yours very respectfully,

Windsor, August 22, 1854. CHARLES TAYLOR.

A HALF-HOLIDAY!

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

60, *Bishopsgate Street Within, August* 19, 1854.

SIR,—I beg respectfully to announce to you the commencement of the Saturday half-holiday system in the Wholesale Drug Trade, one firm having already generously and most considerately acceded to the wishes of their establishment in this respect.

Such liberality, I trust, will not be without imitation; and when it is considered how little inconvenience is sustained, and how much benefit is bestowed by the grant of two-and-a-half hours weekly to a large body of workmen, such as is necessarily employed in drug warehouses, I am sure the trade will not hesitate ultimately to adopt it.

I am, Sir, your obedient Servant,

CHARLES W. JAYNE.

TO CORRESPONDENTS.

The Proceedings against the Pharmaceutical Society.—Some correspondence has taken place between the Under Secretary of State and the solicitors engaged in this case. It is needless, however, to weary our readers with a repetition of the sophistry and unscrupulous statements resorted to by the opponent and his solicitors with a view of giving an artificial colouring to the proceedings. We need only observe that the statements of the solicitors are at variance with those of their own counsel. It would, therefore, be useless for us to waste words in speculating as to which are right.

A.B.—Collodion for Photographic Purposes:—

Iodide of potassium, 5 grs.
Bromide of potassium, 1 gr.
Rectified spirit, ℥iij.
" ether, ℥v.
Gun cotton, 5 grs.

Dissolve and use clear. To be used with a 30 grs. nitrate of silver bath and developed with sulphate of iron—10 grs. to 1 oz. for positives, ℥j. to 1 oz. for negatives.

Inquirer (Mile End Road).—(1 and 2.) Chemists may sell the articles mentioned if required for medicinal use. (3.) *Oleum Viride.* (4.) The powder sent as "*Terra Alba*" is magnesia.

G. (Exeter).—(1.) Fresenius' *Instruction in Chemical Analysis.* (2.) The label enclosed would render the medicine liable to the stamp duty.

A Member (Liverpool).—*Tinctura Iodinii*, not the compound.

S. (Hawden).—See vol. xii., page 314; and vol. xiii., page 149.

Theta (Market Drayton).—(1.) Ordinary calcined magnesia. See vol. viii., page 229. (2.) The turbidity of cod-liver oil would depend on the temperature at which it was filtered. (3.) No deposit would take place in pure distilled water.

Mr. C. F. Markes (Callingford) finds chlorate of potash, in the proportion of about one grain to a pint of water, beneficial to leeches during the unhealthy season.

J. McL. (Dublin).—We are unable to give the formula for *Leeming's Essence.* Beasley's *Druggists' Receipt Book* contains a variety of formulæ for sprains of horses.

W. W. (Liverpool) should apply by letter to the Secretary, 17, Bloomsbury Square.

C. (Birmingham).—We do not know the composition.

A. P. S.—Blue Writing Ink. See Gray's *Supplement*, by Redwood, 2nd edition, page 735; and vol. xii., page 70 of this Journal.

A Member (Cheltenham).—Any person may prepare and sell chloride of zinc, but it could not properly be sold as Burnet's fluid. A saturated solution is convenient for sale, which may be diluted when used.

Delta (March).—Blackie's *Imperial Dictionary*, £4 4*s.*, Webster's £1 11*s.* 6*d.* The former answers best the description required.

An Apprentice (Manchester).—It is a question for a magistrate or a jury to decide.

S. M. (Birmingham) should obtain some elementary work on Chemistry, and in a few minutes would be able to answer the questions himself.

Mr. Hamilton's specimens of prepared lamb-skins will be laid on the table at the next Pharmaceutical Meeting.

We have received from Mr. P. L. Simmonds a communication recommending "Bitter Bush" (*Eupatorium nervosum*, *E. villosum*, and *E. odoratum*) as a certain cure for diarrhœa and cholera, on the authority of an anonymous writer in a Jamaica newspaper and a Mr. March. If the drug possesses the efficacy ascribed to it, it is surprising that its character has not been established in the West Indies, where both the cholera and the alleged remedy abound.

We have to acknowledge the receipt of the *Young Man's Magazine* for August (published at Glasgow) containing an article on "Druggists' Drudgery."

Veritas (Newcastle).—The preparation sold as chloric ether, consists of Chloroform, 1 part; Rect. Sp. Wine, 6 or 7 parts.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. IV.—OCTOBER 1st, 1854.

THE SCHOOL OF PHARMACY.
A FEW WORDS OF ADVICE TO STUDENTS.

In times gone by, a notion prevailed that scientific pursuits were incompatible with the successful career of a tradesman. It was supposed that the only education necessary for an apprentice was a superficial acquaintance with the materials which comprise the stock of the shop, mechanical skill in manipulation, and a good address in serving customers. This delusion, so far as relates to the business of a Pharmaceutical Chemist, is now dispelled. The public at large are as familiar with general science and the elements of Chemistry, as were the Chemists and Druggists fifty years ago. The science of Chemistry has undergone an entire revolution within that period. Pharmacy, which is the application of Chemistry to the preparation of medicines, has made equally rapid advances. The processes in the laboratory and the dispensing of prescriptions, can no longer be conducted with safety by uneducated persons. The Pharmaceutical body is recognized by the Legislature and by the medical profession, and a man who desires to occupy a respectable position in the business, must obtain the necessary credentials by passing an examination. The examinations of the Pharmaceutical Society were, in the first instance, very lenient; but lenient as they were, some young men were found incapable of passing them. Ignorant of the rudiments of Chemistry, unacquainted with the properties of ordinary drugs, and having paid no attention to botany, they were obliged to re-enter upon a course of study which ought to have been completed during their apprenticeship, and some of them on presenting themselves for examination a second or a third time passed with difficulty. This was the case when a very moderate standard of qualification was required, and the candidates being unprepared for the change which the Pharmaceutical Society was designed to introduce, had a claim on the indulgence of the Board of Examiners. The circumstances of the case are now materially changed. Nearly fourteen years have elapsed since the commencement of the new era in Pharmacy—since the announcement of the fact that the qualifications of the future generation of Pharmaceutical Chemists would be submitted to the test of examination, and that a course of study was necessary to prepare them for this ordeal.

Means of improvement have been provided which did not previously exist. Many young men have taken advantage of the opportunity thus afforded, they have passed the examination with credit, established themselves in business, and are now enjoying the reward of their labours in the success which has attended their undertaking. Their example is a beacon to others, and the same result can only be attained by similar exertion. The transition from the old system to the new has been gradual, but it is now complete. No young man can say that he is taken by surprise, that he is unprepared for the change. Due notice has been given: the proceedings of the Board of Examiners have been gradually matured, and the standard of qualification required is much higher than it was at the time the Board was first appointed. Scientific knowledge is no longer a luxury to be enjoyed by those only who can afford to neglect their business. It has become a necessary acquirement, without which no person can assume the name of a Pharmaceutical Chemist, or enter into the business with any prospect of success. It is true that the law does not oblige every person who opens a druggist's shop to pass an examination; but the rank and position of a Pharmaceutist, which the public are beginning to appreciate, and which is becoming increasingly necessary to all who desire to enjoy the confidence of the profession, can only be obtained in the manner prescribed by the Pharmacy Act.

The School of Pharmacy, which is about to renew its activity, is carried on for the purpose of facilitating the acquirement of the requisite knowledge. Students connected with the Society are invited to attend the lectures free of expense, and may join the practical class in the laboratory on payment of a fee, less than one-third of the amount at which laboratory instruction was formerly given. Attendance at the school is not compulsory. Knowledge may be obtained in any place or by any means that the student may select, but the advantages offered by the Society are especially adapted to the wants of the Pharmaceutical Student, and those who are in a position to enjoy these advantages are strongly advised not to neglect the opportunity. The announcement of the lectures and laboratory instruction will be found on the cover of this Journal, and we hope a large class of students will be found in the School of Pharmacy at the time appointed.

THE MEDICINE STAMP AND LICENCE ACTS.

(RECAPITULATION.)

To refresh the memory of our readers and to serve as a general answer to future correspondents, we subjoin, in a condensed form, the conditions which bring medicines under the operation of the Medicine Stamp and Licence Acts.

The Acts are only applicable to compounded or prepared medicines; simple drugs being exempted. Seidlitz and soda powders also are specially exempted. The liability to stamp duty depends on the answers to the following questions:—

First.—Is the medicine a secret or occult preparation?

Secondly.—Is it stated to be prepared ONLY by the person whose name it bears?

Thirdly.—Is it, or has it been, recommended, on the label, or on a handbill, or by any public advertisement, as a remedy for the cure or relief of any disorder?

In all of these cases it is liable to the stamp duty, and the vendor must take out a patent medicine licence.

The *first of these three conditions* requires little comment. A secret nostrum, or quack medicine sold as such, is liable under any circumstances. The law is, however, interpreted leniently with regard to ordinary domestic remedies, such as antibilious pills, cough pills, aperient pills, stomachic powder, essence of ginger, &c., which are sold by all Chemists without any pretensions to exclusive right or mystery in the preparation. But if the *second condition* be infringed by the words "prepared only by A. B.," then A. B. is liable as the maker of a nostrum exclusively prepared by himself. Even if the formula or mode of preparation be publicly known, and the original maker or inventor state that the genuine article is prepared only by himself, all others being spurious, he is liable as a person claiming superiority over all others. Such preparations as liquor opii sedativus, liquor taraxacii, liquor sennæ, &c., although each maker may profess superior skill in the manipulation, are not liable, because these medicines are not sold as nostrums for any specific purpose, but are comprised among the preparations ordinarily prescribed by medical men and used in dispensing establishments. But if such medicines, or even preparations of the Pharmacopœia be sold with labels or directions recommending them for any particular disorder, they come within the *third condition* above named, and are therefore liable. This condition has given rise to a variety of questions and attempts at evasion, but the only qualification allowed is the following:—It is granted to be a matter of necessity that every medicine shall be so designated that it shall be distinguishable from other medicines. For example, the words "cough pills," "antibilious pills," &c., may be used to identify the pills; but the words "pills for a cough," or "pills for bilious complaints," &c., make them liable, because the licence to use such expressions would open the door to an extensive evasion of the Act.

The recommendation for any disorder has the same effect whether on the label or on any printed handbill issued separately, or in an advertisement. It is only necessary to prove that the medicine is the one referred to in such handbill or advertisement, and it is liable. According to the strict letter of the law, any medicine which ever has been advertised as a remedy for the relief or cure of any disorder, is liable. But the Commissioners interpret this provision with some leniency. For example:—"Dr. Gregory's Stomachic Powder" may have been formerly so advertised, but its composition is now publicly known, and it is recognised as a domestic medicine universally employed. It is therefore not held to be liable unless sold with a recommendation for any disorder. The same remark applies to essence of chamomile and ginger, essence of ginger, and other medicines of that class.

The above instructions are sufficient for the protection of those who are disposed to keep within the letter and spirit of the law. To persons who are ingenious in contrivances for evading it, we have only to observe, that the gain is not worth the risk. We have seen a label for Concentrated Essence of Sarsaparilla, on which it was stated to contain "all the medicinal properties so well known to exist in the root." With the bottle was a handbill, which contained, among other information, an extract from a medical work, detailing the disorders for which sarsaparilla is beneficial. Such evasions are neither safe nor creditable.

This subject has assumed a different aspect from that which it presented when we first had occasion to allude to it. At that time, the provisions of the law were not understood. Many Chemists found themselves unexpectedly subjected to penalties when they had no idea in what respect or on what principle they had committed a breach of the law. This led to explanations and correspondence with the authorities at Somerset House. The full particulars with regard to the actual state of the law, its interpretation and the exemptions, have been published, and are now repeated in a condensed form, for the benefit of those whose memory is treacherous, and others who do not read this Journal. We intend to print separate copies of these instructions, which we shall send by post to any correspondents who may write for information on the subject.

In reference to the mode in which the proceedings of the Commissioners of Inland Revenue are conducted, it should be generally known that no common informer is ever employed or recognised. The persons who lay informations are officers engaged at a regular salary, and having no interest in the convictions, who are sent to various localities to ascertain whether the law is observed, and to take measures for enforcing it if necessary. The object of the proceedings is not to raise money by penalties, but to protect the revenue and at the same time to protect the honest tradesman who complies with the requirements of the Stamp Acts, against the unfair competition of his less scrupulous neighbours, who, either designedly, or from culpable ignorance, evade the tax which in justice should be paid by all alike. In some instances the visit of the officer has been the result of information received from Chemists who found themselves undersold by the guilty parties, and who, in self-defence, desired that others should be made to pay the tax, and thus placed in the same position with themselves. When we see the law wilfully violated, we have no sympathy with the parties whose laxity of principle brings them into trouble and disgrace; but in any case which admits of a reasonable defence or explanation, the breach of the law having arisen from a misunderstanding or casual inadvertence, we are glad to afford any advice or assistance in our power, and have always found the authorities at Somerset House disposed in such cases to grant every indulgence that could fairly be expected.

THE CHOLERA, THE MEDICAL PROFESSION, AND THE BOARD OF HEALTH.

The severity of the epidemic has diminished, but the conflict of medical opinions as to the proper treatment continues to increase. We have no disposition, nor is it in our province, to discuss questions relating to medical practice; but the circumstances attending this epidemic, which is in imagination, if not in reality, at every man's door, and which is a subject of general conversation, justify a departure from our general rule, and claim a few remarks on what is passing around us.

It is usually observed, that when the epidemic is on the decline the severity of the cases diminishes, and as a natural consequence the vigour of medical controversy increases. We say *as a natural consequence*, because, during the climax of the epidemic the *tendency* is towards death, and the great preponderance of fatal cases furnishes a practical answer to every theory which is suggested; but when the fatal influence (whatever it be) is on the decline, the *tendency* is towards recovery, and the preponderance of cases terminating favourably, affords a colourable ground for belief that the treatment has been successful. This gives rise to a variety of theories and inferences deduced from statistical reports, and founded on the assumption that recovery and cure are synonymous terms. A comparison of the contradictory statements thus published, and the incongruous list of remedies severally recommended by their respective advocates, affords strong ground for believing that the question, whether the patients were cured by the remedies, or whether they recovered in spite of them, is as much involved in doubt and mystery as was the probable effect of the treatment before it was tried.

We have before us several papers by medical men, advocating in strong terms the use of castor oil, as recommended by Dr. George Johnson. On the other hand, we have the following extract from a report of the Board of Health:—

"It appears that in eighty-nine cases of cholera, treated by fourteen different practitioners with castor oil, on the plan recommended by Dr. Johnson, sixty-eight were fatal, recovery having occurred only in fifteen cases, while the six remaining cases are still under treatment."

The administration of large doses of calomel, as recommended by Dr. Ayre, is designated as "a delusion and a humbug" by Dr. Shorthouse, who states that he found nine drachms of calomel unchanged in the stomach of one patient.

Many practitioners continue to recommend sulphuric acid, which in some stages of diarrhœa has been found successful; others condemn it altogether as a remedy for cholera, and recommend carbonate of soda. Phosphate of soda has also been recommended, and we have seen the report of a case said to have been cured by three pinches of ipecacuanha powder (one scruple each) snuffed up the nostrils by mistake.

Mr. Grove, of Clapham, recommends sulphur as an antidote to the poison of cholera, and quotes several cases in support of his views. But he goes further, and says:—"Should it be proved as I anticipate that sulphur is an antidote to the cholera poison, it is not unlikely that the same remedy may be available for other epidemic diseases. That such a desideratum is attainable, as a general specific for epidemic diseases, has been the belief of many of our most able physicians of past times, and is the opinion of some of the present day."

Just at the time of going to press we have received a letter from Mr. Wilmott, suggesting the addition of charcoal to sulphur in small doses, frequently repeated, a mode of treatment which was tried at Bristol in 1849. This plan is founded on the supposition that the poison of cholera is a fungus. Sulphur is also recommended by the advocates of the animalcule theory.

The inhalation of sulphurous acid gas, and the application of mustard cataplasms to the entire surface of the body, may be mentioned as peculiar and rather extreme measures. Ice in the mouth, hot water and mustard to the

extremities, and opium or morphia applied in the form of suppository, may also be added to the list. It would be curious to enumerate the infinite variety of stimulants, narcotics, salines, and the combinations of these remedies, with mercurials and purgatives according to the various theories, or modifications of theories, which have their advocates.

Such is the lamentable state of the case during the prevalence of an emergency requiring prompt and energetic treatment, the ravages of which are so rapid that before a medical man can be in attendance the chance of recovery may be lost. The public naturally desire to know what precautions they ought to take, and what medicine they ought to keep in the house in the event of a sudden attack, in the absence of medical aid. The advice of the Board of Health, which we subjoin, casts no light on the subject of remedies, but in general terms refers each patient to his own medical adviser; leaving accident to determine according to the adviser who may happen to be called in, whether the treatment be hot or cold, acid or alkaline, purgative or astringent, stimulant or sedative, or any combination of incongruities which necessity, the mother of invention, may contrive as a forlorn hope, in the absence of any known method of combating the urgent symptoms.

It would be unreasonable to expect the Profession or the Board of Health to discover and point out a specific or infallible remedy; but amidst the chaos of opposite and inconsistent theories, it might be hoped and expected that some assistance would be afforded in unravelling the web of perplexity by the indication of a safe course to be pursued when no doctor is at hand. However wide the margin, however general the suggestions, a "casting vote" in favour of some one of the many courses between north and south, east and west, would tend to allay public apprehension.

Silence under the conflicting circumstances above stated, leaves the road clear for quacks, who take every advantage of the opportunity, and puff their nostrums with unblushing impudence and effrontery, while the medical profession hides its diminished head in the *olla porrida* of controversy, and the Board of Health looks on, and says, "send for a doctor." But we are told that the Board of Health does not profess to go into the details of medical treatment. Its functions relate to sanitary measures which come within the province of the parochial authorities, the water companies, and the Commissioners of Sewers. In regard to these and similar measures, the Board has been active, and has used every exertion in the performance of the duties which devolve on it. The President, Sir Benjamin Hall, has personally inspected some of the districts where cholera has prevailed, and with the aid of medical advice has given directions for the removal of all known and tangible sources of disease by cleansing and fumigation.

There is also a Medical Council co-operating with the Board of Health, from whose exertions and experience much benefit may be expected. Circulars have been issued to medical men throughout the country containing papers to be filled up in a tabular form, showing the number of cases of cholera, the treatment, and the result. From the statistical information which is thus about to be collected (provided care be taken in filling up the returns not to confound cholera and diarrhœa) we may hope that some definite conclusions will result, and that the Medical Council, aided by the powers it possesses of collecting evidence, may be enabled to clear up the doubts and conflicts which at present mystify the medical profession, and thus to extricate the public from the clutches of advertising quacks.

INSTRUCTIONS OF THE GENERAL BOARD OF HEALTH.

The Medical Council of the Board of Health having been requested by the President to prepare any formula that the Board might make public for use in cases of premonitory diarrhœa before the arrival of medical aid, the following resolutions were agreed to :—

"That the Medical Council think it, as a rule, dangerous for non-medical persons to resort to the use of drugs without medical advice, and especially they deprecate the extensive use of opiates on the one hand, and, on the other hand, of aperients, such as castor oil and salts.

"The Medical Council, moreover, deem it impossible to prescribe a remedy which would be appropriately or even safely taken by all persons suffering from diarrhœa.

"They are of opinion that the paper called 'Precautions against Cholera' contains instructions for all the measures which the public unadvised should adopt. But they suggest that the heads of families should consult their usual medical attendants as to the measures to be taken in cases of emergency, and that the medical officers appointed by boards of guardians, and other parish authorities, should take care to give the same information to persons of the poorer classes.

"General Board of Health.—Precautions against Cholera.

"1. Apply for medicine immediately to stop looseness of the bowels, or it may bring on cholera.

"2. Do not take any strong opening medicine without medical advice.

"3. Beware of drink, for excess in beer, wine, or spirits is likely to be followed by cholera.

"4. Drink no water which has not been boiled; and avoid that which is not quite clear and without taste.

"5. Avoid eating meat that is tainted, decayed or unripe fruit, and stale fish or raw vegetables. Cooked vegetables, or ripe and cooked fruit in moderation, are a necessary part of diet at all times.

"6. Avoid fasting too long; be moderate at meals.

"7. Avoid great fatigue, and getting heated and then chilled.

"8. Avoid getting wet, or remaining in wet clothes.

"9. Keep yourself clean, and your body and feet as dry and as warm as your means and occupation will permit.

"10. Keep your rooms well cleaned and limewashed; remove all dirt and impurities immediately.

"11. Keep your windows open as much as possible to admit fresh air, and, if necessary, use chloride of lime or zinc to remove any offensive smells.

"12. If there are any dust or dirt heaps, foul drains, bad smells, or other nuisances in the house or neighbourhood, make complaint without delay to the local authorities having legal power to remove them; or, if there be no such authorities, or if you do not know who they are, complain to the board of guardians."

LATE HOURS OF BUSINESS.

In pursuance of certain resolutions passed at a Meeting of Chemists, reported in our last number, page 140, the Secretary of the Early Closing Association has issued a circular addressed "To the Assistant Chemists of London and its suburbs." The tenor of this circular is not in accordance with the spirit of the arrangement which we understood to have been agreed to among those who take a prominent part in the movement. It has already awakened doubts and distrust where confidence might have been established, and induced some parties previously favourable, to withdraw their support from the proceedings.

In the hope of preventing further mischief we shall briefly point out the error into which Mr. Lilwall has fallen, and which he might have avoided if he had not disregarded the suggestions contained in our last and the previous numbers.

The tendency of the circular is to place Principals and Assistants in an antagonistic position, while the success of the movement depends upon the joint and harmonious efforts of the two parties.

Passing over the strong expressions — such as imprisonment, servitude, bondage, &c.—which are introduced by way of seasoning, we find the pith and marrow of the document in the postscript, which is as follows:—

"P.S. Communications are urgently solicited containing plain statements of *facts*, illustrative of the privations endured by Assistant Chemists. *Bonâ fide*,

specific cases are what are wanted, giving a detailed description of the Chemist's experience in every-day life, together with a minute and particular account of the articles sold after eight o'clock—taking a range of several nights—also on two or three consecutive Sundays. The pamphlet above referred to will be ready for publication immediately this information is furnished.

"*** The strictest secrecy may be relied upon, as no names will be allowed to transpire; they will only be preserved for the security of the Association."

What a production is foreshadowed in this significant allusion to *secrecy*, and the preservation of names for *the security of the Association!*

Assistants are invited to reveal in strict confidence the privations they endure, and the nature of the business in which they are employed, with this proviso, that the names of the informers are to be preserved for the security of the Association against actions at law. The words admit of no other interpretation, and the inference to be drawn from them is, that the proposed pamphlet is to contain a series of libels against principals, resulting from *a system of espionage carried on under their own roofs by their Assistants.*

The folly of this proceeding is self-evident. Principals and Assistants are fellow-sufferers under the prevalent custom of late hours of business. They are mutually interested in curtailing the period of labour. They have difficulties to contend with, arising from the nature of the business, the liability to cases of emergency at all hours,—not to mention existing prejudices against innovation. They have conferred together with a view of meeting these difficulties. The case is quite strong enough. It requires no exaggeration, no overdrawn or underhand statements, no spies, no concealment of the sources of information. The system AS IT IS, is forcibly described in the subjoined remarks by Mr. Ince, and the system AS IT WILL BE, is the question which remains to be decided. By a calm and dispassionate discussion of the subject, and by the promotion of mutual confidence between Principals and Assistants, we hope to see a good result. But the improvement must be gradual, *it must be voluntary.*

By way of a beginning, we advise each Chemist to close his shop (with the exception of the door) at eight o'clock, without dictating to his neighbours, or calling on them to sign a pledge to do the same. No loss would be sustained by this measure, as business would be conducted as before, but the closing of the shutters would be a hint to the public to the effect that eight o'clock is the limit to the *regular* hours of business. In a short time this would be generally understood, and the habit of bringing orders earlier would be encouraged. This would diminish the pressure after eight o'clock, and the final closing of the doors at an earlier hour would follow as a natural consequence. There is nothing to prevent the general adoption of this course, unless it be the attempt to attain the object by coercion and clamour—the inevitable consequence of which would be resistance and opposition.

It is a remarkable fact that several Chemists, who are notorious for keeping their shops open later than their neighbours, are young men who have recently commenced business, and who, while they were assistants, were among the most clamorous advocates of early closing. The letter (page 187) from the Chairman of the meeting on the 8th September, affords some explanation with regard to Mr. Lilwall's circular.

AS IT IS.

BY MR. JOSEPH INCE.

A POOR Assistant, leaving (at earliest morning) the couch which he shall never see again till after midnight—wearied with that unbroken round of daily littleness which constitutes a Druggist's life (to which the Sunday itself, which frees all others, leaves him prisoner), has seen his heaven lit up with a faint sign of better things. He has heard of a Society which tells him in no ambiguous phrases, but in the direct home appeal of a shilling subscription, that his hours

are numbered, his days are to be shortened, and some space allowed him for the cultivation of any available sense he may happen to possess. Need we wonder that the strange intelligence upsets him not a little; that his face suddenly assumes the appearance of an injured martyr; visions rise before him of a golden age, when benevolent employers shall give him six weeks holidays, and every coming Saturday—when customers shall all get well by eight o'clock, orders be given in convenient time, and the night-bell cease to ring for ever.

Under such influence the assistant rises to the importance of the subject, sends a long letter to the *Times*, which happily is never published, calling his fellow-sufferers to emancipate themselves from the trammels of a system worse than Russian serfdom—appeals to imaginary bondsmen, associated but in misery, to break the iron fetters which chain down the soul, as well as undermine the body. The yoke of despotism has been borne too long, now is the time to strike the fatal blow! Nay, kindling with the opening prospect, he even bursts forth in well-known strains of poetry, generally that line which remarks so ably, that whoever would be free, must do something dreadful on his own account.

It would want a new Columbus to discover the exact bearing of these diatribes, and few indeed would gather that they meant to express an earnest wish on the part of the writer that Chemists and Druggists should have less onerous work and shorter hours.

The good cause is shipwrecked by such unwisely ardent minds, who embody their sentiments in language which to the general public simply conveys nothing, and gives an indistinct but painful apprehension to most respected Principals that they will, one fine day, be murdered in their beds. Gentlemen, your case is strong enough, your cause is just enough, and certainty of ultimate success is sure enough, to allow you to represent the matter "As it is."

A Chemist begins his daily duties at half-past six or seven o'clock. He first dusts the shop, arranges all the bottles, and then looks out for an idea, not customers, for there are scarcely any at such an early period, and in first-class establishments none whatever. Sometimes it happens that the house is literally out-of-windows, all that is supposed to be found inside is tastefully displayed in front. Soaps, syringes, hair and tooth brushes; amadou corn plaisters, a Gazogène, and galvanic chains hung on a plaster cast of the "Greek Slave," with innumerable other articles either immediately connected with a druggist's business, or in the Pharmacopœia. The dressing of this window takes some time, and lasts, perhaps, till breakfast. The Assistant knows from long experience how his tea and toast is mingled up with Castor oil, Senna, and Epsom salt. The first meal despatched, it is work in earnest now—pills, draughts, decoctions, mixtures, lotions, powders endless, and occasional plaisters, mingle in a chaos. Porters rush off with boxes to the rail; customers of all sorts appear by turns: some with a placid countenance will wait for anything for any length of time; others in frantic attitudes are anxious to reach impossible trains in fabulous time, having their medicine made up in the bargain, whilst in the middle of the confusion, a little girl has been sent over by her mother to know if you can change a five-pound note. Time and tide are said to stay for no man, so at last the hour for dinner comes. The Assistant sometimes gets an hour and a shilling dinner at an eating-house, or at a restaurant to learn a little French; but not unfrequently has all his meals at home, in which case the labour of the day is virtually unbroken, for a perpetual tinkling bell keeps ringing—not for another course, but wanted physic. The dinner over, Pharmacy once more claims his attention; the same monotonous round, the same hard work, the same unending, never-ebbing flow of business must be grappled with. The hour approaches when half the wealth of London leaves it for the suburbs, to revel in fresh air and open grounds. The banker's clerk closes his books, the tradesman shuts his shop, the lawyer leaves his office, nay, even the working man goes home, but the poor Chemist, whose weak tea has done little to recruit the exhausted energies of his weaker body, still slaves on at his disheartening

occupation, the air in which he breathes now rendered sickly by a blaze of gas—but the tired hand must ply its cunning, the worn-out brain must toil, and like the poet's "ever-smiling face of ocean," he must assume an all-enduring pleasantness of manner, until the hour of midnight relieves him from the world without, and summons him to a scanty supper, and a solitary room.

The Sunday comes and the wide world rejoices in it. On that high day even a crowded city has its poetry; the church bells bring on the laughing air something of the free gaiety of youth to the most trembling spirit. Trade sleeps for once, while in the solemn exercises of devotion the technical distinctions of society are lost sight of; the rich and the poor meet together assembling in one common temple, for the great God, who himself rested on the seventh day, made them all. What heaven on earth is created by the recollection of the heaven above, the weary and the careworn know alone; hard work and poverty can estimate full well the divine origin of such relief from the steam-pressure and anxiety of life. But the sad Chemist looks and longs, for there is no rest for him. Some open wide their shops all day, and let them glare at night like a cigar divan; while others trim to a respectable appearance, and put a few shutters up, as if there were a death in the family—there is one inside, a moral one. Slight chance has the pale Attendant, wrapped in his white apron like a partial involucrum, to realize the sacred festival; the soul can scarcely rise towards heaven that is tied down to earth by a servant's hair-oil.

Can it be right, although it may be profitable, that such a state of things should last? What is the boon such an Assistant wants? A thousand voices say, a Status. Nonsense, he wants short hours. The case requires no adjectives, we give it "As it is."

Two knights, we read, in ancient time, had a dispute about the colour of a shield, the one maintained that it was red, the other black: chance led them to discover that they each was right—the banner had two sides; from which the world in general have deduced the moral that every question should be viewed on both. Leaving superlatives to those who need them, we may just remark that the whole case relating to the extreme, exceptional confinement of the Druggist is most simple. The question is as follows:—

Here is a trade called Pharmacy, pursued with an attention never found in any other branch of commerce, and protracted over a space of time no other class of men think requisite. Need it be so? Is there a speciality in the occupations of a Chemist and Druggist to require it? Two distinct parties are here involved, the employers and the employed, for it is a mistake to think that the public have much interest in the matter. That respectable individual, we know from daily experience, seldom troubles the Pharmaceutist at those irrational hours at which so many open, and the least candid statement would prevent him altogether from disturbing the midnight rest, of either themselves or others. An amiable public would be amused at the various things put down quietly to their credit: it is not to accommodate expectant customers that the Chemist burns out existence at both ends, it is simply habit, and a bad one.

Let it not, however, for one moment be supposed that it is contemplated, under any circumstances, to neglect a full and proper attention to all cases of emergency. Sickness has no regulating laws, and any establishment would be wanting in both honesty and humanity, that failed to provide, at even the most unseasonable hours, the requisite relief, consequently nothing can ever render Pharmacy an easy occupation. There have been, and still are, various pamphlets written, filled with exaggerated sentiments, on Chemists' drudgery. It may seem unkind to say, but yet the truth requires it, that the deprecated evil is represented under a sterner aspect than the subject warrants. In common life one-half the battle is to take things as they come, and make the best of them, but nobler and far higher aims are there to help the Pharmaceutist. If an Assistant really sees nothing in his daily occupation but drugs, that are retailed at so much an ounce—if, as in some instances is the case, the whole world

is seen by him under the coloured medium of a six or eight-ounce mixture, he has our deepest, most unfeigned commiseration. But if he has once been into a sick-room, and knows that in his hands rests not unfrequently the event of life and death; or that the happiness of families depends upon the nature of his preparations, as well as his personal skill; or if, led by some favourable impulse, he has learnt to take an interest in the objects that surround him—to know their history and remedial appliances, feeling an inward consciousness that though his lot may be a hard one, he is working out the great purposes of humanity;—then casual annoyances will disturb him little, while the troubles which like thorns beset his pathway, will vanish as if dispelled by the wand of an enchanter.

It is, we think, obvious that Masters would be equal gainers with Assistants in their departure from long hours. A Chemist's business, like an island, excludes him from all contact with his fellow-men: to him the delights of social life, the grateful pleasantness of friendly intercourse, the luxury of reading, the moral and mental enlargement which change and occasional retirement can alone bestow, are as much unknown as the issue of the present war. A fretful, wearing anxiety pervades the man: his hair has a tendency to come off in very early life, he lives in his own peculiar and rather narrow circle, seemingly uninfluenced by the advances, passions, or common feelings of all other men. Why not, by a trifling self-denial, link himself with the expanded, healthy, and better intelligence of his own day?

The design of this paper is not to write an essay on early closing, or give any rules to regulate such a movement, for there is a Society just formed that will investigate the subject thoroughly, and we hope with requisite prudence; therefore mere theoretical opinions would be only premature. It will be the object of that Association to show *in what way* the business of a Chemist *may* be confined to rational limits, and by just and calm representation to establish the possibility as well as the justice of the advocated improvement. With such details we have nothing to do, but are most anxious to suggest that whatever plan be adopted;—to make a general sweeping rule, that shall apply alike to every establishment;—to make no distinction between one business that depends exclusively on dispensing medicine, and another whose mainstay is ordinary trade,—would, with the very best intentions, frustrate everything, and annihilate the hopes of all advancement.

In the mean time, it is of the deepest importance that a plain, unadorned statement of the actual condition of an Assistant should be presented. May we be allowed to hint that it is in the individual power of every master materially to alter, without any personal risk, the more than deplorable condition of their dependents. We have little faith in extemporaneous meetings, and still less in declamatory harangues; but we have every confidence in the kind-hearted consideration of Principals, who, we are sure (when once acquainted with the facts), will be more than willing to increase the happiness and promote the welfare of those around them.

Gentlemen, we would say, if time-honoured custom has ordained the hours of business as they stand at present, let the whispers of the new and liberal spirit of the age prevail, and may their promptings be your guardian angel for the future! The energetic, active co-operation of those who are indebted to you for shorter hours and lighter work will more than repay the trifling loss you may sustain by relinquishing one hour at daybreak and two hours at night. Nor do we fear that after such a change the Casinos will be crowded with unusual visitors, or that the newly liberated young men will be found participating in the unhallowed revels of the low scenes of London life. But we look forward into the radiant future, and see there Science hand in hand with business —the quiet evening spent either in innocent amusement or contented STUDY, and no man in the wide world disadvantaged, because the description of Chemistry "As it is," is changed for, "As it should be."

31, *Southampton Street, Covent Garden.*

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE PHARMACOPŒIA COMMITTEE,

Held on Thursday, the 14th of Sept.,

It was resolved,

"That a printed list of the Materia Medica of the three Pharmacopœias of the United Kingdom be sent to every Member of the Pharmaceutical Society; and that he be requested to affix a sign to each article showing the frequency or rarity of its employment in medicine, and also to add any medicine not contained therein which is often prescribed in his locality."

AT A MEETING OF THE LIBRARY AND MUSEUM COMMITTEE,

Held on the same day,

The arrangements for opening the School of Pharmacy were finally settled, and a notice of the particulars was ordered to be published, as usual, on the cover of the Pharmaceutical Journal.

It was also resolved,

"That a Pharmaceutical Meeting should be held on Wednesday evening, the 4th of October, and that these Meetings should be continued until further notice on the first Wednesday in each month."

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

At the Fifth Annual Meeting of this Society, held at the Royal Institution on Friday, the 8th inst., Mr. Rawle, the President, in the chair, the following Report of its proceedings was presented:—

The Council of the Liverpool Chemists' Association, on presenting their Fifth Annual Report, have much pleasure in congratulating the Members upon the continued prosperity of the Society. The number of Members and Associates is at present seventy-eight, and the Treasurer's financial statement shows a balance in favour of the Society.

The proceedings during the past year have been of an interesting character. The attendance at the Pharmaceutical Meetings has on the whole been fully equal to that of any previous year, and considerable interest has been evinced in the subjects brought under notice, as shown by the discussions which have taken place at the close of the various lectures, &c. It will be in the recollection of those who have been Members from the commencement, that one of the leading objects which the founders of the Association had in view was the establishment of a good Pharmaceutical Library; yet, up to the present year, the Council have limited their expenditure in this direction to an annual subscription to the valuable works of the Cavendish Society. Members have from time to time presented books, but the library was deficient in many of the greatest practical importance. To provide in some degree for this want, the Council have voted a sum of £10 for the purchase of books, nearly the whole of which has been expended. The library now consists of upwards of 178 volumes, comprising many of the most valuable works relating to our profession. Before dismissing this subject the Council would appeal to the liberality of Members for further contributions of books, &c., in order to make the library still more worthy of the Society.

Another object which we have in view is the collection of specimens in the various departments of Materia Medica; but, so far, very little has been done in furtherance of this object, when compared with the great facilities afforded in such a town as

Liverpool for obtaining specimens. It is to be hoped that before the close of another year some steps will have been taken in this direction.

The warmest thanks of the Council, and of the Members generally, are due to those gentlemen who have delivered lectures, or read papers, on various scientific subjects during the year, as well as to those who have exhibited specimens illustrative of such subjects; also to Mr. Jacob Bell, for giving insertion to our Transactions in the *Pharmaceutical Journal;* and to Messrs. Pearce and Brewer, for the full and correct reports of our meetings which have appeared in the *Liverpool General Review.*

The meeting of the British Association at St. George's Hall, in September, will be an occasion of much interest, and it is hoped that many of our Members will avail themselves of its advantages and support it by their subscriptions.

The Council recommend that the number of their Members be increased to twelve, and that Law 3 be altered accordingly.

The Members of the Council retiring by rotation are Messrs. Shaw, Abraham, and Walker, who are eligible for re-election.

Your Council regret that the Associates have not availed themselves of the advantages of the laboratory instruction, under Dr. Edwards, to so large an extent as they could have wished.

The President has kindly offered to give a Prize during the ensuing session for the best essay on "Hydrocyanic Acid, its mode of preparation, and the substances from which it may be obtained in the mineral and vegetable kingdoms; its tests, antidotes," &c., to be competed for by Apprentices who are Associates or Members of the Society; and your Council hope that all Apprentices who at present belong to or may join the Society will enter into the competition.

On the motion of the Secretary, Mr. Abraham, seconded by Mr. Shaw, the Report was adopted and the accounts passed.

Dr. Edwards, as Professor of Pharmacy, made his report of what had been done in the laboratory during the last session. He regretted the small attendance, and remarked, that for want of a greater stimulus from the presence of a number, they had not progressed so well as they otherwise would. In class teaching it is requisite to have a good number of pupils, a little competition being necessary to keep them up to the mark. He was sorry he did not feel justified in awarding the usual prize to any of the pupils this session, but highly approved of the suggestion that one should be competed for by the apprentices belonging to the Society.

Mr. Alpass expressed his surprise that out of the three hundred Chemists of Liverpool, there were so few who had taken advantage of the instruction afforded in the laboratory. It said very little for the importance attached to the attainment of that increased information, which, in a few years, Chemists would find it absolutely necessary they should possess.

A ballot for Members for the Council having taken place, it was found that Messrs. Abraham, Shaw, Walker, Alpass, Wright, and Coupland had been elected.

On the motion of Mr. Walker, seconded by Mr. Sumner, the thanks of the Society were given to the gentlemen who had lectured during the past session.

Mr. Walker placed before the Meeting several volumes which had been presented by Messrs. J. Houghton and H. S. Evans; and Dr. Edwards said, that on mentioning the exertions which were being made to establish a library to the Council of the Pharmaceutical Society, they had voted the Society a copy of the *Pharmaceutical Journal* from its commencement.

Dr. Edwards proposed a vote of thanks to the Council of the Society for their services during the past year; which was seconded by Mr. Kirkus, and the proceedings terminated with a vote of thanks to the Chairman.

Most of the Members present then adjourned to their usual annual supper at the Adelphi Hotel; Mr. Rawle in the Chair, and Mr. Shaw in the Vice-chair. After the usual loyal toasts, the Chairman gave the toast of the evening, the "Liverpool Chemists' Association," which was responded to by Mr. Mercer. The Vice-Chairman gave the "Lecturers," coupling with the toast the names of Dr. Brett and Mr. T. C. Archer, who were present, and both of whom had taken great interest in the Association, and frequently afforded it very valuable assistance. Dr. Brett and Mr. Archer both responded. The "Pharmaceutical Society of Great Britain" was responded to by the local Secretary, Mr. Shaw, and the "British Association" by the Secretary of the chemical section, Dr. Edwards, who also proposed the health

of "our excellent Secretary, Mr. Abraham," which was duly responded to. The "Public Bodies of Liverpool" was responded to by Dr. Bradley, on behalf of the Town Council, and Mr. Shaw, on behalf of the Select Vestry. The health of the President and Vice-Chairman was most warmly received and duly responded to, and the company separated at an early hour, highly pleased with the manner in which the evening had been passed.

SPECIAL MEETING AND DINNER.

In anticipation of visitors from other parts of the country on the occasion of the scientific reunion, and the opening of St. George's Hall, a Meeting of the Liverpool Chemists' Association was convened on Tuesday, the 19th of September, to which the President and Council of the Pharmaceutical Society were specially invited. The President and Mr. Bell accepted the invitation, and Dr. Edwards of Liverpool was also present. The chair was taken by Mr. Rawle. The Meeting was not numerously attended, but some interesting discussion took place, and resolutions were unanimously passed, denoting the co-operation of the Liverpool Chemists' Association in promoting the progress and objects of the Pharmaceutical Society, confidence in the Council, and a desire to encourage Assistants and Apprentices to take advantage of the means of improvement now afforded, and to qualify themselves for examination.

The future success of the Pharmaceutical Society was considered to depend on the extent to which the rising generation could be induced to embrace the existing opportunities of becoming better qualified than their predecessors, and thus raising the character and status of their body. The apathy observable among some young men was commented upon, with a strong expression of opinion that those who neglect the necessary course of study during their youth, would have cause to regret their folly in after life, the time having arrived at which Pharmacy could not successfully be carried on without an amount of qualification proportionate with the general advancement of knowledge and education. The appointment of a Committee by the Pharmaceutical Society to assist the College of Physicians in the future editions of the Pharmacopœia, was noticed as an important and satisfactory indication of progress, and one which made it incumbent upon all Pharmaceutical Chemists to co-operate in the scientific cultivation of their profession, and to give the benefit of their practical experience in furtherance of the object in view.

A sincere desire was expressed and warmly responded to, that the Pharmaceutical Society might in future be preserved from internal dissensions, and that the Members would cultivate harmony and good-fellowship in their association with each other, and discountenance by their united influence those feelings of personal jealousy which had been the exciting cause of the legal proceedings.

In furtherance of the social and friendly intercourse which the meeting desired to promote, an adjournment took place to the Adelphi Hotel, where the hospitality of the Liverpool Chemists' Association was displayed to the satisfaction of all present. At the close of the dinner the usual toasts, and others applicable to the occasion, having been drank, the company separated, with the intention of meeting again next year, it having been announced that the Association was in the habit of meeting annually for the despatch of business, followed by a convivial entertainment.

PHYTOLOGICAL CLUB:

WORCESTER BRANCH.

A Meeting of the Worcester Branch of the Phytological Club was held on August 9th. In the absence of Mr. Walker (the President), Mr. Baxter took the Chair. After some preliminary business had been disposed of, the Secretary reported an excursion of a few of the Members to Wyre Forest, near Bewdley, in this county. They were accompanied from Bewdley by Mr. Jorden, of that town, a gentleman who has done more to develop the botanical riches of Wyre Forest during the last forty or fifty years, than any one in the district. Numbers of good plants were gathered, amongst which may be named :—*Scutellaria minor*, *Campanula patula* (locally abundant), *Hypericum montanum*, *Pedicularis sylvatica*, *Epipactis palustris*, *Equisetium sylvaticum and hyemale*, *Aspidium Oreopteris*, *Carex fulva and pulicaris*,

Pyrola minor and media, *Eriophorum latifolium*, *Rubus saxatilis*, *Geranium sylvaticum and sanguineum* (the ground in places being quite red with the latter), *Melica nutans*, *Molinia cœrulea*, &c. But the grand discovery of the day was made by Mr. Jorden, who found, on the margin of a bog, a single specimen of the very rare NEOTTIA ŒSTIVALIS, hitherto known to grow in only one spot in England, the New Forest in Hampshire. All the members looked most carefully for a long time, but failed to find more. As it grew in a spot not likely to be disturbed, it is to be hoped that more will make its appearance next year. The celebrated old Service-tree (*Pyrus domestica*) was of course visited, but it is now a mere skeleton, leafing only at the very summit. Mr. Gissing found some very fine and well-developed *bifid* and *trifid* fronds of *Blechnum boreale*, both fertile and barren. After the report of this trip, Mr. Baxter stated that another excursion had been made by himself and other Members, to the forest, but although they searched for some hours, they failed to find any more of the *Neottia œstivalis*.

Mr. Baxter likewise announced his discovery of *Vicia gracilis* at Powich, near Worcester. Mr. Gissing reported having found *Myosotis sylvatica* at Hartlebury, near Stourport. Although few concerted excursions have taken place, the Members have, individually, well explored different parts of the county during the last year, and hope to have a good collection of plants to forward to the central Club in the autumn.

TH. GISSING, *Secretary*.

ORIGINAL AND EXTRACTED ARTICLES.

KĀTEMFE, OR THE MIRACULOUS FRUIT OF SOUDAN.

BY W. F. DANIELL, M.D., F.R.G.S.
Honorary Member of the Pharmaceutical Society.

IN the *Pharmaceutical Journal* for April, 1852, first appeared a descriptive account of that curious product so often mentioned in the works of African travellers, the *Bumelia dulcifica* of Thonning, or "Miraculous Berry of Western Africa," and an opportunity now occurs of introducing into notice another singular fruit, of a genus in character widely distinct, though fully endowed with similar dulcificant properties.

When visiting Warree and Ebo, so far back as 1839, I casually met with a number of red triangular-shaped pods in the trading canoes from Bocqua and Kakanda, which from their colour I mistook for Kola-nuts (*Sterculia acuminata*, Pal. de Beauv.), as the natives of these localities carried on a considerable traffic with them, and it was not until 1841, during my residence in Old Calabar, that I became convinced of my error, by experiencing in person their extraordinary power on the palate. The inhabitants of this latter country are greatly addicted to the use of *Minniefoot*, or palm-wine, of which they imbibe large quantities, and as it is to be procured some distance inland, and requires time for production, acidity with flatness occasionally supervenes, and to obviate this drawback, a few of the seeds are previously sucked, that impart to the liquid the desired flavour and sweetness. The natives assert that this fruit is to be found growing abundantly in the Bosan kingdom, a few miles up Cross river, and is conveyed from thence by the palm-oil canoes, to be vended in the larger Efic towns; they are, however, not only much less in size, but of inferior quality to those from Central Africa.* In 1853, when in Sierra Leone, to my extreme surprise, I discovered that the same plant was cultivated in many of the gardens of the colonists, having been introduced a few years since by an Akoo trader, from seeds imported from Yorruba, and I was informed that he subsequently realised no insignificant sum from their early proceeds, since it was of recent date that (in consequence of their extensive diffusion) the capsules were retailed in the colonial markets at the moderate price of one halfpenny each.

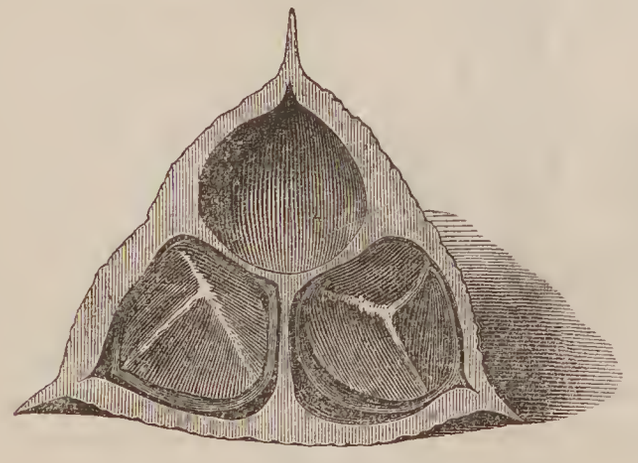
* One of these capsules, transmitted from Old Calabar in 1841, was deposited in the Museum of Materia Medica of King's College, by Professor E. Forbes, and may now be seen in that collection.

The people of Sierra Leone commonly have recourse to them, with the view of rendering more sweet and palatable an acidulated kind of bread, termed *Aggadé*, prepared from maize; sour fruits, and bad palm wine. By the Akoos and other Yorrubean tribes, they are designated *Kātemphe* or *Kātemfé*, but different names are elsewhere in vogue up the Quorra and in Old Calabar. The berries of the *Bumelia* or *Synsepalum* above mentioned, are distinguished by the title of *Agbahnyu*. An examination of the plant producing these capsules, afforded at once decisive indications that it belonged to the genus *Phrynium*, and from the places where it abounded, evidently delighted in humid, shady, and marshy localities, either beneath the foliage of trees, or sheltered coverts of brushwood. Under such auspices it grew plentifully in several of the gardens fringing the Kissey road, and also in Regent village, from which the specimens were obtained now represented in the plate.

It flowers in August and September, and in fact throughout the year, if favourably situated on the banks of streams, or within swampish localities permeated by a constant supply of water. The flowers are of a light purple tint, proceeding but a few inches from the root, and the fruit comprises two or three triangular fleshy pericarps, each containing three seeds, which from being partly buried in the ground, are at first of a brownish or dirty green, gradually changing into a dusky red when approaching maturity.

The seeds are enveloped in a thick viscid mucilage, that adheres with such tenacity to the episperm, as to be detached with some difficulty. Within this mucilaginous sheath, the dulcificant property resides; more concentrated, however, in that portion connected with the semilunar or horse-shoe-formed cavity of the hilum. When this substance is placed in contact with the tongue, an indescribable yet intense degree of dulcidity is immediately conveyed to the palate, produced probably by the action of some peculiar acid upon the gustatory nerves, the influence of which remains unimpaired for a considerable period, though gradually diminishing in strength. Under this abnormal effect, sour oranges, limes, and every species of unripe fruit, however acid or austere they may be, become transmuted into a pleasant and delicious sweetness, and so agreeable are the sensations induced, that the stranger from the rseult, and without any hesitation, confirms the award of that singular potency for which it has been so justly famed.

Although these seeds, within their capsules, have been brought to England carefully preserved in syrup, they have nevertheless lost to a great extent their characteristic qualities; sufficient however remains to attest the extraordinary influence they must have exerted when in their natural condition. The flowers, fruit, and entire plant having been submitted to Mr. Bennett, have been determined by him to belong to a new species of *Phrynium*, which he has done me the honour to name after me.



1. Capsule cut transversely; two of the seeds are left and one removed.

2. Seed cut longitudinally, showing the horse-shoe shaped embryo enclosed in the farinaceous albumen.

PHRYNIUM DANIELLI.—*Bennett.*

DESCRIPTION OF A NEW SPECIES OF PHRYNIUM FROM WESTERN AFRICA.

BY JOHN JOSEPH BENNETT, F.R.S., SEC. L.S., &c.

This species of *Phrynium*, specimens of which have been presented to the British Museum by Dr. Daniell, to whom we are indebted for its discovery, is distinguished from all others from Western Africa, by its truly radical leaves and inflorescence, the creeping rhizome sending out no stalk, and the inflorescence being so little elevated, that, as Dr. Daniell informs me, the capsules are frequently buried beneath the surface of the ground. It has also other important marks of distinction, which are indicated in the following characters:—

Phrynium Danielli, foliis radicalibus longè petiolatis ovatis, spicis radicalibus abbreviatis densifloris, floribus geminatis subsessilibus, sepalis oblongo-lanceolatis, labello latè obovato in disco processu carnoso instructo, capsulâ subbacatâ ovoideo-triquetrâ angulis alatis.

Hab. in Africâ Occidentali, Yorruba, ubi *Katemphe* dicta, et unde in Sierra Leone introducta. In hortis vicisque Sierra Leone vicinis culta, in locis umbrosis udis mensibus Augusto Septembrique, in aquosis ferè per totum annum, florens.

Descr.—Glaberrima. Rhizoma repens, hinc inde folia spicasque radicales emittens. Folia radicalia, e quovis nodo bina v. plura; petiolis basi squamis vaginantibus involutis, sesqui-v. bi-pedalibus, dum bini altero basi nudo altero membranaceo-marginato, utroque deinde intùs cavo teretiusculo supernè bicanaliculato, sub laminâ (spatio 3-5 pollicari) paulùm incrassato tereti solido; laminâ amplâ, lucidâ, obliquè ovatâ, basi inæquali rotundatâ, apice acutâ, sub-pedali, 4-6 pollices latâ, nervo medio subtùs prominente, venis lateralibus simplicissimis creberrimis, e quibus tertiâ quartâve quâque reliquis crassiore. Spica radicalis stipite brevi insedens, brevis, bracteis densè imbricatis tecta; rachi glabrâ, flexuosâ; floribus (ex D. Daniell purpureis) in paribus alternis, pedicellis collateralibus coalitis subglobosis ferè sessilibus, singulo pari bracteâ caducâ pollicari latè ovatâ spathaceâ involuto: ovarium pubescens, subglobosum, 3-loculare; loculis 1-ovulatis. Perianthium exterius (calyx) 3-sepalum; sepalis subæqualibus, tubo perianthii interioris paulò brevioribus, oblongo-lanceolatis, obtusis. Perianthium interius serie duplici 6-partitum; tubo semipollicari subcylindrico; laciniis 3 exterioribus subæqualibus, tubum ferè æquantibus, ovatis, obtusis; interiorum laterali alterâ obliquè ovali obtusâ unguiculatâ, alterâ lineari prope apicem unilateraliter antheriferâ, tertiâ (labello) latè obovatâ undulatâ, in disco processu carnoso instructâ. Anthera brevis, subovalis, unilocularis. Stylus crassiusculus, infernè teretiusculus, pilis deflexis retrorsùm hispidus, supernè glaber, sensim incrassatus, apice incurvus, stigmate cyathiformi cucullato terminatus. Capsula subbaccata (matura, ex D. Daniell, saturatè rubra) extùs insigniter corrugata, ovoideo-triquetra, angulis in alam augustam productis, trilocularis, loculicidè demùm ut videtur (sed alis etiam in maturitate ægrè fissis) trivalvis; loculis monospermis. Semen hilo basali lato depresso spongioso affixum, ascendens, ovoideo-subtriquetrum extùs subcarinatum, arillo tenui pulposo saccharino-mucilaginoso adhærente omninò obvolutum; testâ osseâ, nigrâ, minutè granulatâ. Albumen semini conforme, farinaceum, basi pro receptione processùs testæ elongati excavatum. Embryo teretiusculus, hippocrepiformis, crure altero (interiore) breviore, altero (exteriore) basin seminis hilumque attingente inque radiculam nudam depresso-complanatam desinente; cavitate in albuminis centro inter embryonis crura inque eodem plano rectâ, e processu testæ elongato in albumen producto ortâ.

ON THE LEAVES OF THE *COCA* OF PERU (*ERYTHROXYLON COCA*, LAMARCK.)

BY DR. H. A. WEDDELL.*

Among the numerous vegetable riches of Yungas,† there was none which interested me more than the *Coca*, in consequence of the various and sometimes contradictory opinions put forth regarding it. I trust that a *résumé* of my studies on this remarkable plant will be perused with interest.

My readers are aware that *Coca* is the dried leaf of a shrub to which botanists have given the name *Erythroxylon Coca*;‡ it occurs wild, I am told, in several parts of Bolivia; but I have myself studied it only in the cultivated state, and it is this cultivated plant alone that will be here in question.

The employment of *Coca* as a masticatory§ goes back to the time of the first Incas, a period when it was reserved essentially for the solemnities of religion‖ and for the use of the monarch; none other might raise it to his mouth, unless he had rendered himself worthy by his services, of partaking this honor with his sovereign.

The localities in the Peruvian empire where the plant could be cultivated, were then few in number; but in proportion as its territories became extended by new conquests, plantations were multiplied, and the use of *Coca*, spreading more and more, became at last general; so that at the period of the Spanish invasion, the Peruvians were accustomed to use the article as a medium of exchange; and when money of gold and silver entered into circulation, *Coca* was the principal object of commerce in the country.

The Spanish speculators appreciating the advantages they might derive from the culture of the plant, were not slow in appropriating it to themselves as a monopoly; and so great were the profits they obtained, that, the number of plantations having increased beyond measure, there were soon not hands enough in the valleys to give them the requisite care. They then employed the Indians of the Cordillera, enrolling them by force as for the labour of the mines. But the transition from a cold and dry climate to one both warm and moist reacted so fatally on the health of the new workmen that the central government, roused by the numerous

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* Extracted from Dr. Weddell's *Voyage dans le nord de la Bolivie.* Paris, 1853, 8vo, ch. xxix.

† A province in the north-east of Bolivia.—Ed. Ph. J.

‡ Clusius (1605) appears to be, after Monardes (1569) the first botanist who has treated on *Coca*, which was, however, known in Europe at an earlier period through the accounts given by the historians of the conquest of Peru, but the first who received in Europe authentic specimens of the plant, was Joseph de Jussieu, one of the travelling companions of La Condamine. The life of the adventurous botanist was, however, nearly sacrificed while crossing the Cordillera of Coroico in 1749, in order to study this famous plant. "Il me fallut," he says, "passer la montagne neigée et marcher plus de 4 à 5 lieues dans la neige, la descendre par des chemins taillés en forme d'escalier, au bord de précipices affreux, et avoir à chaque instant, et pendant 7 à 8 lieues, la mort devant les yeux. Ma mule s'abattit deux ou trois fois sous moi; je fus obligé de la laisser estropiée et hors d'état de me pouvoir servir davantage. La violence des rayons du soleil réfléchis par la neige me causa une des plus douloureuses ophthalmies que j'aie éprouvées de ma vie, et ce qui me chagrinait le plus était la crainte de devenir aveugle, car je ne voyais rien. Mais une abondante fluxion de larmes, causée par la même irritation, au bout de vingt-quatre heures d'un tourment continuel, me rendit la vue et la sérénité, et fut ma guérison. La beauté et l'abondance des différentes plantes que produit cette région me consolèrent et me dédommagèrent des travaux passés." . . .

The specimens sent by Joseph de Jussieu to his brother, in 1750, were subsequently examined by Antoine-Laurent de Jussieu, who referred the plant to the genus *Erythoxylon*, and finally served as types for the description which Lamarck gave of it under the name *Erythoxylon Coca* in his *Encyclopédie.*

The generic name refers to the colour of the wood of several of the plants composing the group; as to the word *Coca*, of which, so far as I know, no one has sought to give the etymology, it probably comes from the Aymara *Khoka*, signifying *tree* or *plant.* The shrub producing the Paraguay Tea (*Ilex Paraguariensis*) is called *la Yerba*, i.e. *the plant;* and the same may be the case with the Peruvian *Coca.*

§ In accordance with usage, I designate *Coca* a *masticatory.* In its use, it is however distinguished from ordinary masticatories, and especially from tobacco, by one peculiarity, which is, that the saliva, the secretion of which it excites, is never rejected.

‖ The sacrificing priest never consulted the oracles without holding some *Coca* leaves in the mouth, and throwing some into the fire which consumed the victims.

complaints addressed to them on the subject, was on the point of ordering the destruction *en masse* of all the plantations of the country. The representations of the parties interested in the question, supported by the arguments of several celebrated legal authorities, diverted this threatening resolution, and the cultivation of the *Coca* remained authorized, on the condition of only voluntary and well-paid labourers being employed upon it.

One may form some idea of the warmth with which the government espoused the cause of the Indians in this affair, from the fact of the Viceroy of Peru, Don Francisco de Toledo, having promulgated no fewer than seventy-one decrees in their favour.

This occurred in the latter half of the sixteenth century. In the following century the cultivation of *Coca* took a retrograde step, in consequence of the diminution of the Indians, who were its chief consumers; but by little and little the trade afresh increased, so much so indeed that at the present day it appears to be about equal in importance to what it was at the period of its greatest prosperity, when in the mines of Cerro de Potosi alone it was consumed to the extent of a million *kilogrammes* [2,204,860 pounds (Avoird.)] annually.

The cultivation of *Erythroxylon Coca*, as carried on in Bolivia in the present day, does not appear to differ from that which prevailed previous to the conquest; and the province of Yungas de la Paz* is that which, since the Spanish occupation, seems to have supported the most considerable plantations. All the slopes of the mountains, below an elevation of 2200 *mètres* [7217 feet], are literally covered with them, and the traveller has continually in view the factories or *haciendas* where the leaf is prepared for the purposes of trade.

The *Coca* shrub is propagated from seed. For this purpose the seeds, immediately after gathering, are scattered on the surface of the light and frequently watered soil of a little nursery (*almaciga*) where they come up generally at the end of ten or fifteen days. The waterings are continued, and should the sun strike the young plants too violently, they are sheltered with mats.

The following year the shrubs, whose height is already from 40 to 50 *centimètres* [16 to 20 inches] are transplanted into a plot of ground specially prepared for them and called a *cocal*. The arrangement of these plantations is much more complicated than that of an ordinary plantation and varies according to the inclination of the surface. When the *cocal* occupies the slope of a mountain, which is the usual case, the cultivator forms a series of narrow steps, each intended for a single row of shrubs, and the more elevated (consequently, the less numerous) as the surface is more steep.† They are generally supported by little stone walls which serve not merely to contain the earth and prevent its drying, but also to protect the stem and roots of the young shrubs from the too direct influence of the solar rays, by means of the projection which they form above the level of the soil.

Where the ground is level, they make, instead of steps or terraces, simple furrows (*uachos*) in a straight line and separated from one another by little walls of well-moulded earth, called *umachas*, at the foot of each of which is planted a row of the shrubs more or less far apart from each other.

At the end of a year and a-half the plant affords its first crop, and from this period to the age of forty years or more it continues to yield a supply. Instances are cited of *Coca* plantations which have existed for nearly a century and which still produce. Nevertheless the greatest abundance of leaves is obtained from plants of from three to six years of age. When the trees run up too much, the produce is less than when they spread: they are therefore pruned in some cases to favour an increase in breadth which, however, is never considerable as the form of the shrub is irregular. The average height of the wild plant appears to be about two *mètres;* but in cultivation it is generally allowed to attain but one *mètre* [39 inches].

The first gathering which takes place in a Coca plantation is at the expense of only the lower leaves of the shrubs; and it is therefore called *quita calzon.*‡ The leaves of which this gathering consists are larger and more coriaceous than those of subsequent collections, and also have less flavour. They are mostly consumed on the spot. All the other gatherings go by the name of *mitas*, and take place three

* The word *yungas* signifies in the Aymara language, *warm valleys.* The medium temperature is from 18° to 20° [64° to 68° Fahr.]

† On some of the slopes the inclination exceeds 45°.

‡ From *quitar*, to take away, and *calzon*, pantaloon.

times, or exceptionally four times, per annum. The most abundant harvest is that occurring in March, that is, immediately after the rains : this is the *mita de marzo*. The most scanty is that which takes place at the end of June, or beginning of July, and which is called *mita de San Juan*. The third, named *mita de Santos*, is made in October or November.

The watering of the Coca plantations greatly increases their productiveness. Forty days are then sufficient, I have been told, for naked shrubs to become covered with new leaves; but these leaves are not equal in their properties to those produced without irrigation; their colour also is less deep and they frequently blacken in drying. Artificial watering is needful, moreover, only during the dry season, and the cultivators who have the means of employing it, realise nearly always four, and sometimes even five, crops in the year. This is particularly the case in the districts of Irupana, where there are facilities for obtaining water that do not exist elsewhere.

I have examined the soil in which *Coca* is cultivated, and almost everywhere have found it composed of sandy, argillaceous earth, softish to the touch; it originates in the decay of the schists which form the chief geological feature of these mountains. The soil of the coca plantation is, in one word, formed of what we call primitive or normal earth [*terre franche ou normale*];* but it is naturally mixed with an abundance of angular fragments of unaltered schist which, if not removed, would interfere with the growth of the roots. This is therefore done by the cultivator while preparing the furrows for the reception of the shrubs, the stones being employed for the little walls before spoken of; indeed these little walls or *umachas* are often formed entirely of the stones thus met with. I need hardly say that it is to the greater or less perfection to which this preliminary operation is carried, and to the labours incurred subsequently in stirring up the soil from time to time and in keeping it free from weeds, that the *haciendero* owes the abundance of his crops. The last operation I have mentioned, is especially needful while the shrubs are young. The weeding, which is regularly performed after each crop has been collected, is called *mazi*.

The collection of the leaves of the *Erythroxylon* is performed much in the same way as that of tea. It is, in general, women and children that are employed upon this operation, which is all the easier from the presence of the little walls separating the furrows of the plantation. The gatherer squats down and holding with one hand the branch she wishes to pluck, removes with the other all the leaves, often one by one. The leaves are deposited in a cloth which each Indian carries with her, and afterwards collected in sacks or some other recipients to be carried from the plantation.

Nothing is now easier than the preparation of the *Coca*. The leaves are carried from the plantation to the house, or *casa de hacienda*, where they are spread out in the sun, in little courts constructed especially for the purpose and the floors of which are formed of slabs of black schist (*pizara*); if the weather is fine they are left there until completely dry, which takes place without their shape becoming altered. They are then packed with strong pressure into bags made of the sheath of the banana leaf, strengthened with an outer covering of coarse woollen canvas. The bales thus formed contain, on an average, twenty-four pounds of leaves and go by the name of *cestos*. The *tambor* is a bale of double the size of the *cesto* whose price at La Paz varies from $4\frac{1}{2}$ to 6 piastres (22 fr. 50 c. to 30 fr.)

I have endeavoured to collect some data as to the average production of the plantations of coca in the province of Yungas, but the information given me on this subject, is but vague. The surface under cultivation is estimated by the *cato*, a superficial measure varying according to the district, but which appears on an average, to equal about 900 square *mètres* (9 *ares*). The produce of the most flourishing coca grounds of Yungas appears to be in the proportion of from eleven to twelve *cestos*, *i. e.* 264 to 288 pounds, of dried leaves per *cato*, whilst the poorest plantations afford but from one to two *cestos* at each gathering. The medium production would be from seven to eight *cestos* per *cato*. The annual produce of the whole province is estimated at more than 400,000 *cestos*, or 9,600,000 Spanish pounds.

(*To be continued.*)

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* This is also the soil of almost all the virgin forests of the Andes.

PREPARATIONS FROM *CANNABIS SATIVA* IN INDIA.

(*Extract of a Letter from C. J. Muller, Esq., dated Patna, October* 28, 1853, *addressed to Dr. Hooker.*)

In India two varieties of intoxicating drug, prepared from the hemp-plant, are known in the bazaars,—one called *Ganja*, the other *Bhang*. In this part of India the *Ganja* is procured from the district of Rajshahye (north of Calcutta); *Bhang* comes chiefly from the districts of Tirhoot, Sarun, and Goruckpoor. In external appearance they differ considerably. *Ganja* is in the form of stalks, three or four feet long, with the inflorescence attached, the whole having been dried and pressed flat; the colour a dirty brown, odour strongly aromatic and heavy, very resinous to the touch. This variety is highly intoxicating, which is accounted for by the abundance of resin (the *churrus* of Nepal and other parts). Its retail price, deprived of stalks, is at the rate of about Rs. 200 per maund (80 lbs. avoirdupois), this high price being due to the weight of the tax imposed upon it by Government. *Bhang* is in the form of dried leaves without stalks, or at least with only fragments of stalks, and abounds in the dried inflorescence, apparently female. Its colour is a dull green; it has not much odour, and is greatly deficient in resinous matter; its intoxicating properties are very slight.

Ganja is smoked somewhat in the same way as tobacco; its continued use invariably brings on severe asthma. *Bhang* is not smoked, but is ground up with water into a pulp, and mixed with other ingredients, so as to make a thick drink, called *Subzee*, reputed to be cooling, and highly conducive to health; people accustomed to use it enjoy excellent health, in fact never get sick.

Now it has always been a question with me whether the plants yielding *Ganja* and *Bhang* are identical; see O'Shaugnessy's *Dispensatory*, &c. The natives say that *Ganja*, like the Rajshahye drug, cannot be manufactured here nor in any of the neighbouring districts. *Bhang* grows in abundance, and is absolutely wild in the Bhagulpoor and Tirhoot districts, springing up everywhere in the former like a weed. With the view of inquiring into the matter, I have raised several *Bhang* plants in my garden this year; they are now coming into flower. The plants which have completely flowered are, with the exception of one, to all intents and purposes, monœcious, while all the botanical books I have access to, make *Cannabis* strictly diœcious. The single plant, which appears to bear only female flowers, is not completely in flower yet. The male flowers come last, and may yet appear, or I may have overlooked them. You will be interested, I think, in examining the inflorescence, and therefore I enclose some specimens. [They appear to be true *Cannabis sativa*.—Ed.] It is requisite to ascertain whether the Rajshahye plant presents the same character, and I have therefore sent to Rajshahye for specimens.

You will perceive that this subject is curious, as bearing upon the alleged fertilization of female flowers of the diœcious class, in the absence of the male plant; for example, *Cœlebogyne*, *Lychnis dioica*, &c. If diœcious plants have a tendency, under certain circumstances of soil and climate, to become monœcious, the anomaly of fertilization in the absence of the male plant, is in a great measure removed. This remark rests, however, on the assumption that *Cannabis Indica*, *sativa*, *Ganja*, and *Bhang*, are all identical, a point I think yet extremely doubtful; though I can scarcely make up my mind to believe that Roxburgh, Ainslie, Wight, Griffith, and Royle, could have failed to ascertain this, if there had been any specific difference.

The female flowers greatly predominate in the specimens under my observation. The anthers in the male flower are often less than five, but are fully charged with pollen.—Believe me, &c. &c., C. J. Muller.

THE CINCHONA BARKS,

AND THE MORE IMPORTANT QUESTIONS WHICH, IN THE PRESENT STATE OF SCIENCE AND COMMERCE, RELATE TO THEM.

BY MM. DELONDRE AND BOUCHARDAT.

(*Continued from page* 83.)

The authors, before continuing the description of the remaining species of New Granada bark, direct attention to a circular, from which the following is an extract:

"The very high price of Bolivian calisaya, consequent upon the monopoly of

exportation, has given rise to the exportation of barks derived from other districts, and *differing widely in quality from the calisaya, inasmuch as they contain chiefly quinidine.* The lower price of these barks has led to their being readily employed in many factories for the extraction of quinine, without any regard to the difference in their constituent principles, and hence a large quantity of quinine, containing quinidine, has been introduced into the market, and has produced an unmerited depreciation in the price of quinine."

It could not, they consider, be mistaken, that the object of this circular was to depreciate the products of their factory, and to give an increased value to the Bolivian bark, and to the sulphate of quinine prepared from it.

The remark in the paper read by M. O. Henry, in 1852, before the Academy of Medicine, that "those who pretend that an exclusive preference should be given to the Bolivian calisaya, do not consider that this would unjustly deprive at once industry, navigation, and medicine, of a valuable resource in the barks of other parts of America," has been justified by the subsequent temporary prohibition issued by the Bolivian government against the exportation of bark, in order to augment the price of the supply which was already in London. The result was, that the price suddenly rose 50 per cent., and the consequences would have been serious if there had been a deficiency of other barks, which have formed two-thirds of the quantity consumed in the preparation of quinine.

The merchants of New Granada, fearful of the outcry raised against their bark in France, have exported it to England, and those who there joined in the contest have, as usual, profited by it, and have procured supplies at a cheap rate. Don Rafael Duque Uribe, of Bogota, says, in a letter received by M. Delondre :

". . . . I have exported several thousand serons of bark for the London market, only because I was compelled to do so by the furious opposition made in France to the use of the New Granada barks, while in London, on the contrary, although there is an apparent depreciation of them in accordance with the opinion entertained in France, I have always been able to sell at a good price."

Moreover, the bark which yields the so-called quinidine, is the least abundant; it is imported only occasionally, and as an exception.

Pitaya bark.—This bark is brought from New Granada, and is collected in the forests of Pitayo, in the province of Popayan ; it is exported chiefly from Bonaventura, because the expenses of transport are less by that route than by way of Santa Martha and Carthagena.

M. Delondre received one of the first specimens of this bark in 1830; it was analysed by M. O. Henry, who found it rich in quinine and cinchonine.

In 1839 M. Peretti, of Milan, stated that it contained a peculiar alkaloid, to which he gave the name of *pitayne ;* but M. Guibourt has since shown that it contains only quinine and cinchonine, and he has with justice classed it among the barks richest in febrifuge principles.

Hitherto the collection of this bark has, unfortunately, been very limited ; it is certainly one of the most valuable barks.

The pieces of this bark vary in length from three to fifteen centimetres, and in thickness from two to fifteen millimetres.

The inner surface is pale red, of very compact texture, sometimes smooth, sometimes with rather deep longitudinal furrows. The outer surface is rugose, irregularly cracked, covered with a dirty white epidermis thicker than in other barks from New Granada, but very strongly adherent.

The transverse fracture is brown with fine fibres, which are not readily detached, and it presents a very marked resinous layer under the epidermis. The taste is bitter, slightly styptic, slowly developed, but very persistent.

The yield of this bark is from twenty to twenty-five grammes of sulphate of quinine, and ten or twelve grammes sulphate of cinchonine from the kilogramme.

The sulphate of quinine obtained from it is as pure as that from calisaya bark ; it is soluble in eight parts of ether after the addition of two parts of solution of ammonia.

Calisaya bark, from Santa-Fé de Bogota.—This bark has only recently been obtained from the forests of New Granada, and the results obtained from the first trials of it, are such as to encourage its collection. It is even richer in alkaloid than the pitaya bark, and the product comes near to that of the best Bolivian barks.

During the last year it has arrived only in small quantity, almost always mixed with the other serons of pitaya bark derived from the same places.

The pieces of bark are very slender, the thickness rarely exceeds four millimetres, the length is from two to five centimetres. The outer surface is almost smooth, there is little appearance of epidermis, the colour is uniformly yellow, with a slight tinge of red. The inner surface resembles much that of the Bolivian calisaya.

The texture is not very compact, the fracture resinous, presenting towards the outer surface short fibres, which may be easily detached by the finger.

The taste is decidedly bitter, aromatic, and without astringence.

This bark yields 30 grm. of sulphate of quinine, and 3 or 4 grm. of sulphate of cinchonine for the kilogramme. It appears calculated to replace the Bolivian calisaya.

Maracaybo bark.—This New Granada bark is named after the port at which it arrives from the interior. It contains scarcely anything but cinchonine.

The bark in the form of small chips, varying in length from two to four centimetres, and in thickness from one to two millimetres, is sometimes of very compact texture with a resinous fracture ; sometimes its fibres are soft and easily detached. The outer surface is sometimes covered with a very thin epidermis, with white marks ; sometimes there is no trace of it, and the surface presents longitudinal furrows, irregular but very close.

The yield of this bark is from 10 to 12 grm. of sulphate of cinchonine, and 2 or 3 grm. of sulphate of quinine for the kilogramme.

This bark would not appear therefore to be of any value unless it should be found that the efficacy of sulphate of cinchonine is in a degree the same as that of sulphate of quinine.

Bright red bark.—This is found in the forests of the province of Quito ; it is exported from Guayaquil in serons or in chests containing 50 or 60 kilogrammes.

For a long time this bark was preferred in medicine, and with good reason, for it is one of the richest in alkaloids.

The flat bark is from five to twelve millimetres in thickness, the epidermis is sometimes very thick, split in all directions, sometimes of a silvery white and easily detached, sometimes of a brown spongy nature. The other bark has an adherent epidermis, which is as it were incorporated with the layer beneath, without fissures, and covered with rugose patches of a deep reddish-brown colour.

The inner surface is reddish-brown, slightly pink at the fracture, of a uniform texture, with short delicate fibres which are easily detached, and penetrate the skin, causing violent itching, like the Bolivian calisaya ; beneath the epidermis there is a very thick resinous layer. The bitter taste is readily developed, and is also slightly styptic.

This bark yields the same products as the pitaya bark : from 20 to 25 grm. of sulphate of quinine, and from 10 to 12 grm. of sulphate of cinchonine for the kilogramme.

Pale red bark.—This, like the previous bark, comes from the province of Quito, and appears to be furnished by the branches of the same tree whose trunk yields the flat bark, as is the case with the Bolivian calisaya.

It is generally in quills or half-quills, about three or four millimetres in thickness ; the epidermis with which it is covered is, like that of the flat bark, sometimes silvery with fissures, and sometimes adherent, with the same characters of rugosity and brown colour.

The inner surface is smooth, pale red with even fibres, very short and very compact. The fracture is even and resinous outwardly.

The taste is decidedly bitter and penetrating, but less styptic than that of the flat bark.

The yield of this bark is from 15 to 18 grm. of sulphate of quinine, and 5 or 6 grm. of sulphate of cinchonine for the kilogramme.

Yellow bark from Guayaquil.—This bark is quilled, the pieces very long, the colour somewhat resembles that of canella, the outer surface is marked with very close longitudinal furrows of little depth, and presents traces of a very thin white epidermis. The inner surface is more brown, of an even and very compact texture. The fracture is resinous, with short fibres at the interior part. The taste is bitter, sharp, and without astringence.

The yield of this bark is 30 grm. of sulphate of cinchonine, and 3 or 4 grm. of sulphate of quinine for the kilogramme.

For some years, no more red bark has been imported from the republic of Santa

Fé, and in the hope of directing the attention of the merchants of that state to the abundant sources of revenue which they possessed in the forests of Quito, M. Delondre sent to them, during his stay at Valparaiso, specimens of the two kinds, bright-red and pale-red bark, and it was upon that occasion that he received some serons of the yellow bark just described. During the last four years, two large quantities of very fine red bark have been sent to London, and it is to be hoped that this new produce of the forests of the equator will not fail in future.

Quilled orange-yellow bark.—This bark has been met with in separate serons of the same weight as the others, and sometimes mixed together with other serons of orange-yellow bark, in large thick flat pieces. It would seem to resemble very closely the bark described under the name of Bogota calisaya, except that the pieces are longer, frequently quilled like Ceylon canella, and sometimes very thin ; the thickest are four millimetres, but many pieces are not more than one millimetre thick. The outer surface is smooth, with some traces of a thin white epidermis ; the orange-yellow colour is brighter than that of the larger pieces. The inner surface is darker and smooth. The fracture is fibrous at the interior, resinous at the exterior. The taste is decidedly bitter, and is readily developed without astringence.

The yield of this bark is 18 grms. of sulphate of quinine, and 4 or 5 grm. of sulphate of cinchonine for the kilogramme.—*Répertoire de Pharmacie*, June, 1853.

MATERIALS FOR PAPER-MAKING PROCURABLE FROM INDIA.

BY J. FORBES ROYLE, M.D., F.R.S.

Paper, it is well known, is in Europe made chiefly from linen or cotton rags, but also from the refuse and sweepings of cotton and flax mills, as also of the coverings of our cotton bales and of worn-out ropes. But paper is also made from the stems and leaves of many grasses, as from rice-straw, and from the bamboo by the Chinese, and of late from common straw in this country, and even from wood shavings. The fibrous part of many lily and aloe-leaved plants have been converted into excellent paper in India, where the fibres of tiliaceous, malvaceous, and leguminous plants are employed for the same purpose. As in the Himalayas one of the lace-bark tribe is similarly employed, and in China one of the mulberry tribe, and the nettle in Holland. I mention these various sources, because plants belonging to the same families as the above abound in India and other warm countries, and are capable of yielding a very abundant and never-failing supply of sufficiently cheap and very excellent materials for paper-making of all kinds. Some may be used without any further process of bleaching, but all are capable of having any colour they may possess destroyed by chemical means, as I would not even except the jute canvas or gunny bagging, because I have seen specimens of jute of a beautiful silky white, both plain and manufactured into fabrics for furniture, &c., as shown by the late Colonel Calvert at the East-India House. As the Chinese make paper of rice-straw, and of the young shoots of the bamboo, while the Hindoos make ropes of different grasses (such as Saccharum munja, and Saccharum sara), strong enough for their Persian wheels as well as for towing lines, it is evident that these, and probably many others, contain a sufficiency of fibrous material for paper-making. The cultivated cereals cannot well be turned to much account, for their straw forms the chief food for cattle ; but as the country abounds with grass jungles, which are in the autumn of every year burnt down in order that the young blades may spring up and afford pasturage for cattle, it is evident that there are many situations where a sufficiency might be cut down before it has become perfectly dried up, and converted into *half-stuff* for paper-makers.

Of the sedges also some are employed in India for making ropes, as the Bhabhur or *Eriophorum cannabinum*, for making rope bridges for crossing some of the hill torrents. The papyrus, we know, was used by the Egyptians for making their paper, but this was by cutting the material into thin slices and making them adhere together under pressure. But others of the genus, as the Cyperus tegetum, is used in India for mat-making. As these plants, as well as rushes, grow together in large quantities, it would be quite possible in many places to turn them to profitable account.

Many parts of the world abound in the lily and aloe-leaved plants which have been alluded to above, and of which the leaves contain much easily separable fibrous materials. These belong to the genera Agave, Aloe, Yucca, Sauseviera, Bromelia,

and others, all of which abound in white-coloured fibres, applicable to various useful purposes, and of which the tow might be used for paper-making, and considerable supplies obtained. Paper used to be made from the Sausivera in Trichinopoly, and some made of the unbleached Agave alone, and also mixed with old gunny bags.

Among cultivated plants there is probably nothing so well calculated to yield a large supply of material fit for making paper of almost every quality, as the plantain (*Musa paradisiaca*), so extensively cultivated in all tropical countries on account of its fruit, of which the fibre-yielding stems are applied to no useful purpose. The plant, as every one acquainted with tropical countries knows, is common near the poorest huts and in the largest gardens, and is considered to yield by far the largest quantity of nutritious matter. Its fruit, in many places supplying the place of bread, and in composition and nutritious value approaching most nearly to the potato, may, if produced in too large a quantity, be preserved in the same way as figs, or the meal may be separated, as it resembles rice most nearly in composition. Each root-stock throws up from six to eight or ten stems, each of which must be yearly cut down, and will yield from three to four pounds of the fibre fit for textile fabrics, for rope-making, or for the manufacture of paper. As the fruit already pays the expenses of the culture, this fibre could be afforded at a cheap rate, as from the nature of the plant, consisting almost only of water and fibre, the latter might be easily separated. One planter calculates that it could be afforded for £9 13*s.* 4*d.* per ton. Some very useful and tough kinds of paper have been made from the plantain, and some of finer quality from the same material in France.

All the plants which have been already mentioned are devoid of true bark, and are called endogenous in structure. Simple pressure between rollers, and washing, would appear to be sufficient for the separation of the fibres of most of them. But the following families of plants are all possessed of true bark, which requires to be stripped off, usually after the stems have been steeped in water, before their respective fibres can be separated from the rest of the vegetable matter.

The flax plant abounds in fibre, but this is too valuable to be converted into paper. India, however, grows immense quantities of the plant on account of its seed (linseed), which is both consumed in the country and exported in enormous quantities, but nowhere is the fibre turned to any account. This is no doubt owing to the climate not favouring the formation of soft and flexible fibre; but the short fibre which is formed and might be easily separated, would be valuable for paper-making, and might add to the agriculturist's profits without much additional outlay.

Some valvaceous plants are cultivated on account of their fruits, being used as articles of diet, as the Okhro (*Hibiscus esculentus*) of the West Indies and of the United States. The *Ramturai* of India is closely allied to it, and is cultivated for the same purposes. Both plants abound in fine flexible fibre, which is not, but might be easily, separated, and afford a considerable supply, especially if the cultivation was extended in the neighbourhood of towns. Paper is made from a species of *Hibiscus* in Japan, and *Hibiscus Sabdariffa* is cultivated in India on account of its jelly-yielding calyxes. Numerous other species of Hibiscus, of Sida, and of other genera of this family abound in warm climates; several are cultivated in different countries, as *Hibiscus Canabinus* and *Sida Tiliæfolia* in China; more might be so. They grow quickly and to a large size, and abound in fibrous material of a fine, soft, flexible quality, on which account they might be cultivated with profit, and the tow be useful to the paper-maker.

The *Tiliaceæ* are likewise remarkable for the abundance and fine quality of fibre which many of them contain. *Tilia Europea* produces the enormous quantities of bast exported from Russia. *Corchorus olithorius* and *Corchorus Capsularis*, the leaves of both of which are used as a vegetable, yield the large supply of jute imported into this country, as well as the gunny cloth and bags exported even to America. Several species of *Grewia* yield fruit, on which account they are cultivated. Others abound in the jungles, and most would yield a valuable fibre, as some of them already do, for commercial purposes. Some paper is made from gunny bags. Some of the Leguminosæ also abound in valuable fibre. *Crotalaria juncea* yields the common *sunn* of India. *Sesbania Cannabina* yields the *dhanchi* of Bengal; while *Bauhinea racemosa* is used in making the rope bridges in the Himalayas. The fibre of *Parkinsonia aculeata* was sent to the Exhibition in 1851, expressly as being fitted for paper-making; though colourless it wants strength.

Several plants produce large quantities of a silky, cotton-like substance, not ap-

plied to any use, such as the silk-cotton tree, the mudar of India, and several species of Saccharum, which might be collected where labour is cheap, and would no doubt be well fitted for conversion into pulp for paper.

Among the nettle, the mulberry, and bread-fruit tribes of plants, there are many which seem well calculated to yield material for paper-making. The Chinese, we know, employ the inner bark of morus, now *Broussonetia papyrifera*. This, no doubt, produces some of the Chinese paper, which is remarkable for toughness. I believe that the refuse cuttings of the bush cultivation of the mulberry in Bengal might be turned to profitable account. The barks of many stinging (*Urtica*) and of stingless (*Bohemeria*) nettles abound in fibres remarkable for strength; the tow of these might be converted into paper stuff if not required for mixing with wool.

The weeds of tropical countries, which grow in such luxuriance, and among which are species of sida, of grewia, of corchorus, of triumfetta, and of many other genera, might all yield an abundance of fibrous material if the refuse of the above cultivated plants was found not to be sufficient. Some simple machinery for separating the fibre would greatly facilitate operations, while the expenses of freight might be diminished by compression, or, as suggested, by packing the material as dunnage, and the cheapness of labour, as of everything else in many of these countries, would enable material for paper-making to be brought here in great abundance, and at sufficiently cheap rate, if ordinary pains were taken by the consumers in Europe to encourage the planter or colonist of a distant region.—*Journal of the Society of Arts.*

East India House, May 3, 1854.

ON THE USES TO WHICH TURF MIGHT BE APPLIED IN IRELAND.

PEAT CHARCOAL.

In our last number we directed attention to a new and novel application of peat to the manufacture of paper, *papier maché*, and *carton pierre*, and we now purpose to make some observations upon another of its applications, the value of which is already fully appreciated by the public, although but seldom taken advantage of; namely, the manufacture of peat charcoal for deodorizing purposes.

From some remarks which we have seen lately in the newspapers, it would appear that an impression prevails that this application of peat charcoal is protected by patent. This we doubt, because already, many years ago, the distinguished Irish Chemist, Richard Kirwan, suggested this use of peat mould and semi-charred peat for absorbing fetid liquids; and peat charcoal has been employed to some extent for such purposes in Paris for a period of more than twenty years. A patent has been obtained for a peculiar process of preparing it, and probably this led to the notion that no one could make it, for the special purpose of using it as a deodorizer, but the patentee. The manufacture of peat charcoal is therefore open to anybody who is willing to embark in it; and the greater the number is who do so, the greater will be the probability of success, for the demand would be almost unlimited, if the supply were regular, and the article could be sold at a reasonable price.

Porous bodies, and especially charcoal, have the property of absorbing gases, in certain proportions depending upon the nature of the porous substance and of the gas. For example, wood charcoal, when freshly prepared, will absorb ninety times its own bulk of ammonia, but only one and a-half times its bulk of hydrogen. In the same way porous bodies absorb liquids, a familiar example of which is offered in the common sponge. Freshly prepared peat charcoal is capable of absorbing from 120 to 170 per cent. of its bulk of water, and yet form a more or less solid mass, from which water will not drain; consequently, one ton of charcoal will take up nearly two tons of fetid water, and form only a pasty mass. No matter how putrescent the water may be previous to being mixed with the charcoal, all smell will disappear. If more fetid water be poured upon the pasty mass of water and charcoal, the latter not being able to absorb it, the water will filter through, but in its passage will be fully deprived of all disagreeable odour. A bed of peat charcoal will therefore act as a filter for purifying sewerage water, and will completely prevent the escape of unwholesome and stinking effluviæ. The action of peat charcoal is not confined to gases and liquids; even solid putrescent matter, if mixed with it, is almost instantaneously deprived of smell.

The quantity of charcoal which is sufficient to produce any of the effects just

mentioned is comparatively small, so small indeed that no difficulty can arise as to its use upon this account.

In most cities and towns the provisions made to get rid of the excrementitious matter, the sewerage water, the waste from factories, &c., is most defective, and especially in those parts where business is most active, and space consequently more valuable. In many of those places the soil is impregnated with decaying organic matter, or the house is surrounded by or covers one or more cesspools, which are constantly generating noxious gases and effluviæ, which, by their combined action upon the body, lower its vitality, and render the inhabitants extremely liable to catch epidemic and contagious diseases. It is impossible to conceive anything more disgusting, for example, than the provisions made in some houses for privies and water-closets, most of which, when they exist at all, are mere receptacles for filth, without exit, except by soaking into the surrounding soil, and reeking with pestilential exhalations, while they are being filled up in the course of years. In such places the general use of peat charcoal would be attended with the greatest benefit to the public health. And even where the most perfect system of sewerage may exist, its use would be equally valuable, by preventing the polluted drainage liquid of a city being poured into the rivers.

Who that has visited an hospital, no matter how well kept, that is not sensible that much more might be done to render the air pure and free from disagreeable odours, and thus conducive to the health of the inmates. We are fully convinced that fresh air, light, and cleanliness, are quite as useful remedies in all diseases as the most powerful medicines; but unfortunately they are not so generally prescribed as they should be. Among the many ways by which hospitals may be kept in a proper condition, the extensive use of peat charcoal would be perhaps the most effective. It is needless to point out any further applications, as they are already well known to our readers, or will suggest themselves to every one bearing in mind the deodorizing properties of the substance. The uses to which we have alluded will, however, bear out our statement, that the demand for it, if the supply were regular and at a moderate cost, would be unlimited. Before, however, coming to the object of this paper, which is the mode of meeting that demand, or, more properly speaking, of creating it, we must allude to another proposed application of peat charcoal, for the purpose of correcting some opinions held with regard to it, and which we deem erroneous ; namely, the employment of peat charcoal as a manure.

Without denying that peat charcoal may have some action as a manure, we are convinced that its value in that respect has been greatly exaggerated. A substance can only act as a manure in two ways—mechanically or chemically. To act in the former capacity very large quantities must be employed. If some twenty or thirty tons of peat charcoal were mixed with the superficial layer of soil of an acre of land, it might perhaps produce a perceptible influence upon the physical properties of the soil ; but any one who has ever seen two tons of charcoal sprinkled upon the same area, will at once admit that such a quantity could produce no perceptible influence upon the physical character of the soil. The chemical influence of a manure is judged by the absolute amount of certain constituents which it contains, and also by the peculiar condition or state of combination in which they exist. Our information as to the relative value of each ingredient is no doubt very defective, and on this account no absolute judgment can be pronounced upon the absolute manuring value of any substance. Certain general principles have, however, been established, and these enable us to ascertain approximately the relative manuring value of a substance, or at least sufficiently so to be of great practical use.

The first element in the value of a manure, whether considered in its mechanical or chemical character, is its cost. This is quite intelligible ; for a manure may be very valuable at 5*s.* per ton, and worthless if it could not be sold for less than £1 per ton. Now this is exactly the case with peat charcoal; it contains in its ash many valuable constituents, but the price at which it has hitherto been sold is more than double what the same substances could be purchased for in other forms. When peat charcoal is mixed with night-soil, or other similar substances, in the proportion of two of charcoal and one of night-soil, or even of equal parts, the value of the mixture, estimated on the same principles as are usually applied in the case of guano, would not be more than 15*s.*, or at the utmost, £1 per ton. At least we have seen no samples, the analyses of which would warrant the assumption of a higher value.

Hitherto the prices charged for peat charcoal have been such, that the sum realized by the manure produced, if estimated at its true value, would not be sufficient to cover the original outlay for the charcoal. For example, if one ton of charcoal cost £2, and that it be used for deodorizing an equal quantity of night-soil, the resulting manure might be worth £1 per ton, and would therefore realize £2, the original outlay for the charcoal. This would be an exceptional case, however, for in the majority of cases where the use of charcoal would be beneficial as a sanitary agent, the substance which the charcoal would absorb or be mixed up with would be merely sewerage water, urine, &c., which contain but little solid matter, and would not add much to the real value of the charcoal as manure—one ton of which would perhaps not be worth more than 6*s.* or 7*s.*

If peat charcoal be used for domestic purposes by the wealthier classes, the value of the resulting manure is a matter of comparative unimportance, not alone from the small quantity produced and other circumstances of a social character, but because people who can afford it are at all times ready to pay for anything that conduces to their comfort. Peat charcoal would therefore be employed by such persons, irrespective of any ultimate benefit to be derived from the manure. But it would be quite different if it comes to be used by the poorer classes, in hospitals, &c., and it is in this direction that its use would be attended with most public benefit: the manure produced should yield a premium upon the price of the charcoal. This clearly could only be done by producing the charcoal at such a price that the manure produced by its use as a deodorizer would be worth more than the price of the charcoal. Although, as we have remarked above, the production of manure would exert no influence upon the use of small quantities of peat charcoal for domestic purposes, in the houses of the wealthier classes of cities, the lowering of its price would, as in the case of every other commodity, tend to increase the demand. In order, therefore, to extend its use amongst all classes, and to obtain the largest amount of public good from its employment, the great object to be attained is to produce the charcoal at a cheap rate.

The question of how this is to be done presents itself under two points of view; the cheapest mode of raising raw turf, and the cheapest and most effective process of charring it.

With regard to the first point much may be said, and it is perhaps one of the most important subjects which could be discussed; but as we will return to it again on the earliest opportunity, we may therefore pass it over on the present occasion, and assume the cost of raising turf upon the experience of the large operations which have been conducted within the last few years in Ireland.

A few years ago Mr. Jasper W. Rogers got up a company for the manufacture of peat charcoal, under the name of the Irish Amelioration Society, and a station was established at Robertstown, in the county of Kildare, on the edge of a bog of about fifteen miles in extent, and verging in thickness from fifteen to twenty and even thirty feet.

The factory was so placed that it was below the level of the part of the bog where the turf was dried, and afforded considerable facilities in consequence for the transport of the turf to the factory by means of a tramway. The first operation, preliminary to cutting the turf, was to drain the bog. This was effected by cutting a large trench in the direction of the axis of the bog, and sunk about three or four feet into the subsequent deposit of marl and gravel. A number of drains cut at right angles to the main trench carried off the water of the lateral parts of the bog. The main drain or trench discharged itself into a small rivulet. The drainage rendered the turf more compact, and gave it a firm consistence, which allowed of its being easily worked. The cutting of the turf was effected by making a series of platforms of considerable length on each side of the principal trench, and parallel with its direction; the bricks, as fast as cut, were carried away on wheel-barrows and laid out to dry; the subsequent management being the same as usually practised.

Although this system was on the whole not very economical, owing to the great amount of wheeling required, the turf could be brought to the factory, after an air drying of about one month, for 2*s.* per ton. At the works of the Irish Peat Company, near Athy, where there is no organized system of turf cutting yet established, but where, nevertheless, a good economy of labour is observed, the average cost of producing one ton of well dried turf, inclusive of rent of bog, cost of cutting canals, and making drains, would be about 2*s.*, supposing 40,000 to 50,000 tons to be annually

cut; the very dense peat would of course cost much less, say 1*s.* 4*d.*, and the very light flow peat about 2*s.* to 2*s.* 6*d.* This sum corresponds pretty nearly to the cost in Bavaria, where turf is abundant and used for a great variety of purposes. The turf is there artificially dried; and one ton of the light fibrous is usually considered to cost 2*s.* 5*d.*, and the dense black turf 1*s.* 3*d.* to 1*s.* 4*d.*, the mean of both being under 2*s.* It is proper to remark, however, that the artificially dried turf is superior to our air dried. The men earn at turf cutting in Bavaria about 1*s.* a day, and the women and children 4½*d.* to 5½*d.*; that is practically the same wages as are earned at Athy, but one-fifth more than was paid by the Ameliorating Society!

By the careful distillation of good air dried turf, from thirty to forty per cent. of charcoal may be obtained, but in practice more than twenty-five per cent. need not be calculated upon by the methods at present in use; at Robertstown, from twenty-three to twenty-five per cent. was the quantity obtained. Assuming it then at twenty-five per cent., or one-fourth, four tons of peat would be required to produce one ton of charcoal; this at 2*s.* per ton for the turf would give 8*s.* as the cost of the raw material. The next question to be considered is, what is the cost of charring?

A great many methods have been proposed to char peat, and the question of the cost of charring entirely depends upon which method is selected. We shall accordingly describe briefly the chief of these methods.

Mr. J. W. Rogers's plan consisted of a sort of grating placed upon a kind of tramway a few inches below the general level of the floor of a building, consisting of three sheds, formed of roofs supported upon pillars, and open in great measure at the sides, provision being left in the roof for the escape of vapours and smoke. Over each grating was placed a truncated square pyramidal sheet-iron case, the top or truncated portion being capable of being covered. A little lighted turf or charcoal was introduced into this case, which was then charged with turf; as soon as the turf was fully kindled, the cover was put loosely upon the top, and the carbonization went slowly on, assisted by a small quantity of air, which got in under the edge of the bottom, and burned the gases. After a certain time the mass sunk down; the void was then filled up with fresh turf, this operation being performed two or three successive times. After the last charge had been introduced, and the whole of the vapour and the greater part of the gases had been consumed, the lid was fastened on and luted, a small exit-pipe being left for the gases; and so soon as the latter had ceased to be produced, the pipe was closed, and by means of a cock water was allowed to flow round the base to the depth of a few inches, so as to effectually prevent the air from entering the charring oven under the lower edges of the case, and allow it to cool down. The whole operation lasted five hours, of which three were devoted to the carbonization and two to the cooling; so that, including the time necessary to charge and discharge, four operations could be made in twenty-four hours. The charge of each moveable sheet-iron furnace consisted of from 600 lbs. to 700 lbs. of turf, and produced from twenty-three to twenty-five per cent. of charcoal, or 138 to 181 lbs. every operation, or a mean of about 600 lbs. in twenty-four hours, so that it would take four such furnaces to produce one ton of charcoal in twenty-four hours. This system, although ingeniously contrived, was exceedingly expensive, there being a large outlay in plant, a great deal of labour required to feed and manage the furnaces, and above all, the wear and tear, as may be readily understood, was exceedingly great. Considering that the small quantity of charcoal produced had to bear all these expenses, it is very difficult to estimate the expense of producing one ton of charcoal. But we have heard it variously estimated at from £1 5*s.* to £1 10*s.* Such a process does not, therefore, fulfil the conditions which we have laid down above.

At Crouy-sur-Ourcq, near Meaux, where large quantities of peat are prepared for the Paris market, a very good kind of furnace is used. It consists of a cylindrical retort, built of brickwork, of about 250 cubic feet capacity, and therefore capable of holding somewhat more than four tons of average peat; this cylinder is surrounded by a jacket of brickwork, open spaces filled with air being left between the masonry of the cylinder and the jacket, for the purpose of maintaining as uniform a temperature as possible. It is heated by two small fireplaces, the flame and hot air from which circulates round the *shirt* or internal masonry, the smoke escaping through an opening in an iron plate on the top. The top of the retort is also closed with a tight-fitting lid, which is luted when the retort is charged; over this lid is then placed the iron plate just referred to, through which the smoke

escapes, so that the latter is made to pass over the lid of the retort and heat it. The bottom of the retort is closed by a damper, which can be withdrawn when the charge is coked, so as to allow the charcoal to fall into a pit underneath, where it is kept covered up until it is sufficiently cooled to be withdrawn without risking its taking fire, which warm freshly prepared peat charcoal is very liable to do. A pipe issues from near the top, which conveys away the products of distillation; by slight refrigeration the ammoniacal liquor and tar are condensed, whilst the gas is conveyed under the retort, and by its combustion diminishes very considerably the amount of fuel required to heat the retort. This system of retort is therefore continuous and economical, and yields besides a considerable quantity of tar, which may be employed in making gas. Turf of medium quality costs, at Crouy-sur-Ourcq, about 5*s.* 2*d.*, and dense black peat even as much as 7*s.* per ton; but when worked on a large scale the cost may be as low as 4*s.* per ton. The charcoal being made in a close retort, none of it is burned as a fuel to assist in the carbonization of fresh turf, as in Mr. Rogers's process, and hence three tons of good dry peat will yield fully one ton of charcoal. The cost of raw material would thus be from 12*s.* to 15*s.* 6*d.*, and for the finest compact peat, used for making very dense charcoal, even as high as 21*s.*; although a larger product is usually obtained from the latter, which goes a certain way to compensate for the increased cost of the peat. The cost of carbonization may be set down at about 3*s.* to 4*s.*, against which we have to set off 1 cwt. 3 qrs. of tar, the precise value of which we cannot estimate, but it may be set down merely as a fuel at 1*s.* per 1 cwt., or 1*s.* 9*d.* for the produce of three tons of turf. Charcoal would therefore cost at Crouy, by the lowest estimate, 14*s.*, or, calculating by the average price of fuel there, 17*s.* 6*d.* per ton. This is much below the cost at Robertstown, notwithstanding the difference of cost of the peat.

In East Friesland an excellent kind of carbonizing furnace is used, by which the volatile products may also be saved. A solid base is first built, sixteen feet long, thirteen feet wide, and two feet high; upon this is then erected an oblong furnace, twelve feet long, five feet wide, and eight and a-half feet high, the end walls being two feet thick, and the side walls six inches. Parallel with these thin walls, and of the same length and height, and at a distance of one and a-half feet from them, are built two walls, two feet thick. The end walls are continued to meet these thick walls, so as to completely enclose the narrow space between the thick and thin walls; these enclosed spaces form fire channels, and each has at one end a fireplace, one foot wide and eighteen inches high, with a grate and an ash pit, opening one foot square, and at the other a chimney. The chamber enclosed between these fire channels constitutes the retort, and has a charging door, five feet high and three feet wide, at the same end as the fireplaces. The retort is arched over, and from the exterior thick walls or jacket, as we may call them, other arches are sprung, which meet on the top of the retort arch, so as to enclose the fire channels and cover as much of the inner arch as possible, so that the greater part of it may be heated by forming part of the walls of the flues. The floor of the retort is covered with fire tiles, and is hollowed along its whole length towards its centre, to the extent of six inches, and along this central hollow runs a glazed clay gutter, covered with perforated tiles, and having a slight inclination towards one end. The condensed water and tar run along this gutter, and are carried by a pipe from the farther end to a vessel placed in the ground, in a small building about twenty feet from the furnace, the gas being conducted back by another pipe to be consumed in the furnace. Several of these furnaces are usually built in a row, by which, of course, there is great economy of materials and fuel. One furnace of this kind is capable of producing about one ton of charcoal from good compact peat at each operation. The cost of carbonization is of course very materially influenced by there being one or several worked, but we have heard it estimated at from 4*s.* to 5*s.* per ton.

The last form of furnace which we shall notice is one used in Bohemia, and, like Mr. Rogers's plan, is not heated by a separate fire, the carbonizing heat being produced by part of the turf itself, and is maintained by the combustible products of the distillation of the rest. An excavation six feet deep is first made, and in this is built a circular foundation, nine inches deep, and twenty feet in diameter. Upon this foundation the kiln is built; the walls at the base are five feet, tapering on the outside to two feet at the top, the total height being sixteen feet, the internal diameter is therefore ten feet. Where possible, it ought to be built like a lime-kiln, against an incline, so that the top may be on a level with the ground on one side, and the base

exposed on the other, where the charcoal may be discharged with facility. Where this cannot be done, six feet of it ought, at least, to be built into the ground. The kiln is domed at top; the arch being two feet high, a conical aperture is made in the dome, three feet in diameter externally, and two feet internally, which is capable of being closed with a door fitting into a ring of iron built into the dome; this aperture serves for introducing the peat. The discharging aperture, near the bottom of the furnace, is four feet and a-half high, and two and a-half feet wide; this is not closed with a door, being usually built up with bricks when the furnace is charged, but the arched passage which leads to it, and which is made six feet high and five feet wide, may be closed with boards to keep in the heat.

The hearth or floor of the furnace has a circular canal ten feet in external diameter, that is all around the inner circumference of its wall, nine inches wide, and fifteen inches deep, which is intersected by two cross canals of the same dimensions; one of these terminates under the discharging door. These canals are filled with brushwood previous to charging the furnace, and are partially covered over with loose tiles, eighteen inches wide, and eighteen inches long, the intervals between the tiles being nine inches. In charging the furnace a long pole is placed perpendicularly in the centre, where the cross drains intersect one another; similar poles are also placed at the extremities of the cross drains, where they intersect the circular drains. The turf is piled up in layers, each brick being placed on end. When the furnace is full the sticks are withdrawn, the centre one through the charging hole, and the others through four holes left in the arched roof, which may afterwards be closed when required by a brick and some clay, or with a cast-iron cover. The withdrawal of the poles leaves five vertical flues communicating with the horizontal ones. These flues are necessary, because, from the regular form of the bricks of turf, they would pack so close that the draught of air would pass with great difficulty through. The brushwood in the part of the horizontal flue under the discharging door is ignited as soon as the furnace is charged; the air causes the fire to extend throughout the whole of the horizontal canals, a draught being established up the vertical flues. In this way the whole of the mass of turf is ignited equally. The orifice under the discharging door, the charging hole, and the orifices of the four flues around the circumference of the furnace, are kept open until flame freely issues from the five vertical flues, when the quenching must be attended to. To effect this the door of the charging hole is luted on, and the conical hole over it, corresponding to the thickness of the brickwork, filled up with clean sand, the orifice of the horizontal flue, or the "firing hole," is then closed with an iron door, and the orifices of the vertical flues loosely covered, room only being left for the escape of the products of distillation; and when these cease to be generated the latter are plugged up and luted, and the furnace allowed to cool during forty-eight hours.

In some furnaces of this kind the four vertical flues around the wall of the furnace are often made without the aid of poles, being constructed as the charge is filled in; this is, however, a tedious and troublesome plan, and the other ought, therefore, to be preferred as the simplest and most economical.

This furnace has been very successful, both in the quality of the charcoal and the economy of production; the charcoal is very largely employed in many branches of the iron manufacture, for which it is much better adapted than that charred on the principle of the furnace at Crouy-sur-Ourcq. The cost of charring by this furnace is stated not to exceed, with good dry medium quality turf, 4*s*. per ton of charcoal.

Turf is also charged with *meilers* or heaps, as wood charcoal is usually prepared, although from the great contraction which turf undergoes when carbonized, difficulties are experienced which do not occur in the case of wood. These difficulties are not, however, insurmountable, as is proved by the fact that a good deal is prepared in that way in the Vosges, in Bavaria, and in Saxony and Bohemia. Two forms of meilers are made—the circular or bee-hive form, so commonly used for wood, and the rick-shaped.

At the Royal Iron Works of Weierhammer, in Bavaria, where, since 1838, the refining and puddling furnaces, &c., have been exclusively worked with turf, the bee-hive form of heap is the one adopted. A base or level spot is first formed, in the centre of which is fixed a pole; upon the base or hearth is then spread a quantity of broken sticks or brushwood, and upon these some charcoal-waste from a previous operation; the turf is then piled round the stake, so as to form a heap somewhat like a bee-hive in shape. The usual size of the meiler is about 2520

cubic feet, or nearly thirteen and a half tons of the peat of that district. The heap is ignited by putting some brushwood at the bottom of the vertical flue left on withdrawing the stake about which the heap was formed. The heap is covered with sand and turf ashes, the top, however, being left uncovered until the meiler is fully ignited; the subsequent management of the heap is exactly the same as in the charring of wood, except that the turf meiler must be ignited stronger than a wood one before covering up completely, and the carbonization must be conducted to a greater degree before being perfectly choked. Great care must also be given to keep the heap properly covered during the great sinking down which occurs.

In twelve to fourteen days a heap, of the size indicated, is cooled enough to be removed, and in doing so care must be taken not to break up the charcoal too much. If the charring has been carefully conducted, 2520 cubic feet of turf give, at Weierhammer, 700 cubic feet of charcoal, or about 27.7 per cent. in bulk of the peat. This charcoal has very nearly the same density as the peat, one cubic foot weighing about eleven pounds, so that thirteen and a half tons of peat would give about three tons eight hundred weight of charcoal; or in other words, four tons of peat would be required to produce one ton of charcoal, the average weight of charcoal obtained being twenty-five and a-half per cent., or somewhat less than four tons of peat to one of charcoal.

The turf used at Weierhammer costs on an average 2*s.* 11½*d.* per ton, and the estimated cost of a ton of charcoal on the spot is 16*s.* 1¾*d.*, which, assuming four tons to be required to make one of charcoal, gives as the cost of carbonizing 4*s.* 3¾*d.* In the neighbourhood of the *Carolinen Hütte*, near Achthal, in Styria, where some successful attempts have been made to smelt iron with turf in its raw state, mixed with wood charcoal, and where peat charcoal is used in some of the iron works for forging, &c., charcoal made on the same system cost 22*s.* 6*d.* per ton, the turf costing 18*s.* 2*d.* of that sum, or 4*s.* 6½*d.* per ton. This leaves 4*s.* 4*d.* for the expenses of carbonization, or practically the same sum as at Weierhammer.

In Saxony a good kind of rick meiler is made, which has given very successful results. The ground is levelled and covered with sand, and upon this a rectangular space is marked out, fifty feet long, and five to six wide. The centre of this space is hollowed out into a sort of basin, and two fire channels or drains are made along its length, one from each end of the space to the basin, towards which they are made to incline. The basin and fire channels are formed of bricks, the interstices being filled with clay, in order to prevent the liquid products of the carbonization from sinking into the earth. A small gutter passes from the central basin for the conveyance of the condensed liquids to a reservoir. The base being thus arranged, a number of stakes are placed upright along the line of the fire channel, at intervals of ten feet, the meiler is then built to the height of about four feet, fire holes or cross channels being formed from one side of the heap to the other corresponding to the upright stakes. The meiler being complete, the stakes are withdrawn, leaving a number of vertical flues in communication with the central horizontal flue or fire channel, as well as the cross fire holes or flues. A covering is then laid on, composed of clay, sand, and chopped straw or grass, the latter being added to prevent the covering from cracking. This mixture is prepared in two boxes or pits, one at each side of the heap, and a portion of it should always be kept ready to stop up any cracks which may form in the coating during the carbonization. Plugs should be prepared for stopping up the orifice of the main fire channel, and of the cross or lateral ones, for all openings to the windward should always be kept closed, the channels at the other side being sufficient to provide air to maintain the carbonization.

Everything being ready, the firing commences, for which two workmen are required, who ignite at the orifices of the main fire channels at each end of the heap, the brushwood laid along its whole length. When the turf is fully ignited throughout the mass of the meiler, a thick black smoke is evolved from the chimneys; as the charring proceeds it thins, and gradually assumes a greyish-white colour. In proportion as the moisture of the turf evaporates, the greyish-white smoke also thins, and assumes a bluish appearance, and a strong sulphurous smell. The moment that the whole of the vapour has passed off, the fire must be gradually choked ; this point is easily ascertained by holding the hand from time to time over the chimneys, if all has passed off it will remain dry, if not it will condense on the hand.

The peat charcoal carefully made in this way is of excellent quality, and has been, and is being, largely used in Saxony and Bohemia in metallurgical operations. As in all other instances, the cost of the charcoal depends very much upon the cost of the turf, and it is very difficult to separate the latter element from the cost of carbonization. We know of one instance where the charcoal produced by the system of meiler, or heap, cost only 13*s.* 8*d.* per ton ; but we cannot say how much of that sum is to be set down for raw material, and how much for charring. We may, however, assume that the latter element was not more than in the case of the other methods noticed. Indeed, the methods of charring in common use on the Continent, do not appear to differ very materially from each other in cost, judging from the estimates which we have given, and which, so far as the individual cases go, we have every reason to believe to be correct.

Having now brought so many methods of charring under the notice of our readers, it will be naturally expected that we should venture to give an opinion as to those which would be best suited for adoption in this country, or, in other words, to pronounce which were best. The choice appears to us to lie between three :—the furnace of Crouy-sur-Ourcq, the Bohemian circular furnace, and the rick meiler or heap.

The French furnace offers several advantages; it is continuous, and each charge is rapidly carbonized, and so there is great economy of fuel. It is the best adapted for preparing peat charcoal on a great scale, where large capital could be applied to the manufacture. And if the charcoal, instead of being allowed to fall into a pit from the retort, was received in wrought-iron waggons, which could be covered up tightly, and drawn away, and allowed to cool, the temperature of the retort need never be allowed to sink, and the operation would be as continuous as in making coal gas. The charcoal made in the system of close retorts would not, however, be well adapted for metallurgical purposes, at least not as well as when made in some other forms of furnace, but it would be admirably adapted for deodorizing purposes. The Bohemian brick furnace produces admirable charcoal, dense, and nearly as hard as wood charcoal, and therefore well fitted for smiths' use, and for metallurgical operations generally. This furnace has, however, the disadvantage of not being continuous, and however well adapted for small works, it is not so well suited for an extensive manufacture of charcoal by capitalists. A farmer or small proprietor who could erect two or three of these, might, if peat charcoal became an article of general consumption, make a considerable profit. But in the present state of the trade, we fear that any person who would take up the manufacture of peat charcoal, should do so as people do in any other branch of industry. On the whole, however, we believe this system of furnace gives the best results, where it is intended to carry on the operations on a small scale, with a little capital.

The meiler system has the great advantage of requiring almost no capital at all. The manufacture of peat charcoal in this way, may therefore be taken as an example of a manufacture without capital. The charcoal made by it is excellent, and a large quantity may be prepared at once, which is important. To char turf, in heaps, requires, however, much more skill than to char wood, for, in the first place, turf does not ignite so readily as wood ; 2ndly, it does not conduct the ignition through the mass so rapidly; 3rdly, it contracts more in the charring ; and 4thly, it takes a longer time to go out. With attention and some experience, these difficulties may be got rid of, and a lucrative trade created, well adapted to the circumstances of the poorer people.

There is, however, a drawback to the rapid extension of the peat charcoal manufacture upon the system of small producers, which is this, that the product obtained in the charring of turf consists of whole pieces, and of broken fragments and powder; on the Continent the former would find a ready market for kiln drying malt and other grain, and especially for smiths' use, and metallurgic operations generally. In Ireland there would be no market, for the manufacture of malt is not a household occupation, and is entirely confined to the larger towns, where coal can be obtained cheaper than peat charcoal. The small manufacturer would, therefore, have to crush the whole of his product, in order to bring it into the condition in which it is required for deodorizing purposes, and having done so, he would have to sift it, in order to separate the dust from the granulated portion; the latter being the conditions in which it has the greatest deodorizing powers, whilst the dust is of great value for sprinkling over the surface of the moulds in metal casting. To perform

both these operations effectively and economically, a certain amount of machinery becomes necessary, and thus necessitates capital. If, on the other hand, there was a considerable manufacture of hardware, such as buckles, stirrups, bits, files, nails, screws, hinges, bolts, locks, &c., for which peat charcoal is admirably adapted, the whole pieces would sell to advantage to the smiths, and the powder might be sold at a cheap rate without further preparation, for deodorizing purposes.

Three Bohemian furnaces with a small mill, somewhat on the principle of a coffee-mill, and a bolting cylinder for separating the dust, tools, and every other requisite for a small charring establishment, capable of producing at least twelve tons of charcoal per week, might be erected for £300 to £350, a sum quite within the means of hundreds in this country.

We have now, we believe, satisfactorily established, that it does not require great companies, with London offices, secretary, resident director, and other officers, to make peat charcoal; and that there is a wide field of industry available for those possessed of a little capital and persevering industry, from which the public would benefit directly and indirectly. We shall return to this subject again, in order to show what is being done on the Continent in the manufacture of iron, with peat and peat charcoal.—*Journal of Industrial Progress, Dublin.*

PREPARATION OF BINOXIDE OF LEAD.

Wöhler * gives the following process :—

A solution of acetate of lead is precipitated with carbonate of soda, and the mixture treated with chlorine until all the carbonate of lead is converted into brown binoxide, which is then collected by filtration and washed.

No chloride of lead is formed in this way ; acetic and carbonic acids are given off and chloride of sodium remains in solution.

The proportions are four parts crystallized acetate of lead, and three parts crystallized carbonate of soda, from which 2.5 parts of peroxide are obtained.

PREPARATION OF STRONG MERCURIAL OINTMENT.

BY M. POMONTI, OF BASTIA.

I take fresh lard, a quarter part of the quantity to be used, and add to it a solution of nitrate of potash. The solution being mixed with the fat, I add the mercury at intervals, rubbing them continually. After a few revolutions of the pestle the mercury disappears entirely to reappear in a few minutes afterwards, and disappears again to appear no more. Trituration for a few instants more will suffice for the complete extinction of the mercury. In this way I can make, in a very short time, mercurial ointment in which it is impossible to detect any globules of mercury, even with a magnifying glass.

The solution of nitrate of potash employed consists of six grammes (92½ grains) of the salt dissolved in a few grammes of water, which quantity is sufficient for one kilogramme (2lb. 3oz. avoirdupois) of lard.—*Répertoire de Pharmacie.*

ON EMULSIONS OF THE GUM-RESINS AND RESINS.

BY M. CONSTANTIN.

Up to the present time the gum-resins and resins have been but rarely employed, on account of the difficulty of mixing them with liquids for administration. The purification of these substances, even by means of vinegar or alcohol, has been rejected ; for, as Lemery very justly remarks, it is preferable to choose gum-resins and resins free from impurities, than to purify them by any means whatever. In Pharmacy we have only the alcoholic solutions of gum ammoniacum and assafœtida, and the alcoholic and ethereal solutions of tolu, which substances I have most carefully examined, and all of which, when added to an aqueous liquid, very rapidly separate, the resins floating and uniting on the surface of the liquid. But when, as is frequently the case, we have to prepare a mixture or injection containing any of

* *Annalen der Chemie und Pharmacie*, June, 1854.

the gum-resins, gum ammoniacum or assafœtida, for instance, or a resin, more especially that of tolu, which mixes very incompletely, it is, I think, of some importance to obtain a more ready and advantageous process for their admixture than any of those hitherto employed for this purpose. Among those mentioned in works on Pharmacy we find the use of mucilage, or what is preferable, the yolk of egg; but these means, although very good in themselves, become tedious when adopted in hospitals, where, in a short space of time, a large number of mixtures have to be prepared; and even when yolk of egg is used, the resins above mentioned are frequently but imperfectly mixed.

Having frequently had occasion to see the gum-resins prescribed, and among them that of assafœtida, which, as is known, is a very energetic medicine, I endeavoured to find some means of shortening the process of trituration; and I think that the process I am about to describe will be a considerable saving in point of time, and also be more efficacious for mixing the gum-resins, and even the resins. The gum-resins will, in the first instance, claim attention, for the remarks I have to make on the resins are but a confirmation of the first-named process.

Having been called upon on several occasions to prepare mixtures and injections in which gum ammoniacum and assafœtida were used, the following was the method I employed for their preparation :—

I place the quantity of gum-resin prescribed, in small pieces, in a marble or porcelain mortar, and add about four times its weight of alcohol. I then ignite the alcohol and triturate the whole with a porcelain pestle until the alcohol has all burned away. The gum-resin acquires the appearance of a soft extract. The liquid is now added in small quantities at a time, and a perfectly homogeneous emulsion is produced, from which no separation takes place on standing, and in which the gum-resin is very completely distributed, a result which it is difficult to ensure when yolk of egg is used, even after long trituration. In this way the gum-resin is presented to the absorbent surfaces of the stomach and intestines much more effectually than it would be in the form of pill, and the action of the medicine is therefore more certain.

When the quantity of gum-resin prescribed is very large, the addition of yolk of egg will improve the emulsion, by preventing reunion of the resinous portion. A small quantity of powdered gum-arabic might also be added to the gum-resin after the combustion of the alcohol has ceased, in order to render the emulsion more perfect, but this would generally be an unnecessary precaution.

The resins afford results equally satisfactory. It is only necessary to add to them what they require to convert them into gum-resins, and powdered gum-arabic answers this purpose. To the resin, balsam of tolu for instance, twice its weight of gum-arabic is to be added, not forgetting the alcohol in the same dose as before, the mode of operating being also the same as for gum-resins. Balsam of tolu may be thus perfectly suspended, forming an emulsion, the taste of which is very agreeable, and has nothing repugnant to the patient.

As these processes are not described in any works on Pharmacy, I thought they might be deemed worthy of the notice of Pharmaceutists, being simple and expeditious, and affording satisfactory results.

The heat produced by the combustion of the alcohol over the gum-resins and resins, is not sufficient sensibly to alter the qualities of the product, for although some of the aromatic principles of the medicine must be volatilized, the quantity appears to be very small, the peculiar taste and odour remaining apparently undiminished in the emulsion. The loss may be considered as almost nothing.—*Journal de Pharmacie.*

ADULTERATION OF SULPHATE OF QUININE WITH SULPHATE OF SODA.

BY M. R. LEHMANN.

In the examination of a sample of sulphate of quinine recently purchased, I obtained, first, on attempting to dissolve it in alcohol and afterwards on burning it on platinum foil, a considerable residue, which was found to consist of inorganic matter. On examining this more closely, I found that it consisted of sulphate of soda. This adulteration is not unimportant, as ten grains of the quinine examined, contained two-and-a-half grains of sulphate of soda.—*Archiv. der Pharmacie.*

ANTIMONY SHOT.

We observed last month in the *Times*, a statement to the effect that extensive experiments are now being made, by order of Government, to test the effect of shot made from antimony upon wooden as well as iron surfaces. As far as they have been tested, the destructive effects of these balls are more apparent than those arising from iron ones; for as soon as the surface is struck, the metal, owing to its great brittleness, breaks, and the various particles, consequently, become widely spread. The authorities seem to be much pleased with the success which has attended these experiments; and we are informed that an immediate supply of antimony balls will be despatched to our fleets in the Baltic and Black Seas. The use of this new missile will create a demand for our Cornish antimony, which is now in considerable request.

Messrs. Smith and Co., of the Antimony Works, Lambeth, state in reference to the above, that they claim both the idea and the mode of making antimony shot, either hard and brittle or tough. They also assert that they introduced the shot to the Board of Ordnance. Messrs. Smith add, that although no decision has been given by the select committee, the experiments made with antimony shot go to prove that the article is exactly the same in character as the shot which they introduced.

ON THE METAMORPHOSES OF SUGAR IN THE GENERAL PROCESS OF ANIMAL NUTRITION.

BY DR. F. J. BECKER.

(*Continued from page* 34.)

Behaviour of Sugar in the Blood.—According to Liebig's ingenious view of nutrition, sugar—belonging to the class of substances concerned in the process of respiration—after its absorption from the intestinal canal into the blood, comes in contact with several alkaline compounds—phosphates, soda-albumen—which readily give up a portion of their basic constituents; and this circumstance, together with the ready oxidation of sugar, determines its conversion into an acid and the formation of neutral salts, which, like salts of organic acids generally, are converted during the circulation of the blood into carbonic acid and water, the final products being separated from the organism by the excretory organs.

The development of heat attending this change is regarded as necessary for maintaining the organism at the temperature requisite for the performance of its functions. It would, however, seem that the development of heat is not, at least, the chief purpose of the transformation of sugar produced or absorbed by the organism; for in cases of diabetes where such large quantities of sugar are concerned, the temperature of the body does not rise above the normal point.

From a consideration of this fact, from the point of view afforded by the hypotheses alluded to, Mialhe was induced to ascribe the excretion of saccharine urine to a deficiency of alkali in the blood. But Lehmann found no deficiency of alkali either in the ashes of blood from diabetic patients or in the serum, and this result was subsequently confirmed by Bouchardat.

For the purpose of studying more closely the influence of alkalics upon sugar in the blood, Lehmann and Uhle injected into the blood of rabbits, solutions containing grape sugar and carbonate of soda in the proportion of one equivalent to one, two, or three equivalents in from twelve to ninety-five parts of water. For about ten minutes after the injection the urine remained alkaline, and afterwards had an acid reaction, which lasted for about five hours, then gradually decreased. It contained sugar, however, until the eighth hour, and sometimes until the eighteenth hour—much longer than when a simple solution of sugar in the same proportion is injected, in which case Uhle and the author found that the excretion of sugar ceases about the fourth hour.

In order to ascertain whether the introduction of acid into the blood would be followed by neutralization of the alkali in the blood, and, as might be expected, the sugar formed by the liver consequently excreted by the kidneys, three or four drachms of a solution of tartaric acid in ʒviij. of water were injected into the stomach of rabbits four or five times a day. After the second injection the urine became acid, and continued so, without a trace of sugar appearing in it, during fifteen days that the injection was kept up.

The circumstance that puncture of certain parts of the brain produces diabetes seems to afford good grounds for doubting whether the alkalies in the blood are so essentially concerned in the oxidation of sugar as has been generally supposed. Moreover, there does not appear to be any connexion between the formation of sugar by the liver—probably from the fibrin of blood—and puncture of the brain, that would account for the increased secretion of sugar which Bernard has assumed to take place.

It has, however, been shown by Schmidt that normal blood contains a ferment, although its nature is unknown, and that by it sugar is decomposed; so that the view, in which Lehmann now concurs, that the excretion of sugar after puncture of the brain is owing to the absence of this ferment, in consequence of the disturbed nervous agency, gains some degree of probability.

The author's experiments on the behaviour of sugar in the blood consisted in injecting into the jugular vein solutions of grape, milk, and cane sugar. The results obtained from numerous experiments are—

1. The excretion of sugar, after injecting 1.5 grm., lasts only five or six hours, and is almost the same for all kinds of sugar.

2. The excretion of sugar by different animals, under otherwise apparently similar conditions, is very different. In some instances the urine contained abundance of sugar within ten minutes after the injection, in others none could be detected for more than thirty minutes, but in all it appeared within forty-five minutes.

3. The urine has at the first an alkaline reaction, but soon becomes neutral, and then acid about the second hour after the injection, continuing so for some time after the sugar has disappeared. This result appears to indicate the formation of an acid, in the blood, from the sugar.

As the quantity of acid urine, free from sugar, obtained after making the injection was too small for the purpose of a chemical investigation of the acid, some attempts were made to set up the same alteration of sugar artificially. Some portions of normal rabbit urine were mixed with grape sugar and placed in the rabbit-hutch; after the lapse of two days the whole had an acid reaction, and the sugar had disappeared. The same took place with cow's urine. For equal quantities of urine and of sugar, no difference of time could be observed in the formation of acid, whether the sugar was cane, grape, or milk sugar. Two equal portions of fresh clear cow's urine, one mixed with thirty grm. of grape sugar and the other without, were digested at a moderate heat for twelve days, at the end of which time they were evaporated down to the consistence of extract, treated with alcohol, the solution mixed with sulphuric acid, and after separating the sulphates by filtration, evaporated to dryness with hydrated oxide of lead; the dry, powdered mass was then digested in alcohol, the solution evaporated, and again treated with water.

The result of the comparative examination of the products showed that the urine mixed with sugar yielded a much larger quantity of extract soluble in alcohol and water, and containing therefore a soluble lead salt.

The acid found in this salt was chiefly benzoic acid; but there was also another, which the author purposes to examine at a future time, merely stating at present that it cannot be lactic acid.

Further experiments were directed to the estimation of the quantity of sugar which the blood is capable of taking up before being excreted by the kidneys. For this purpose the experience of various investigators on the results of puncture of the brain were taken advantage of, and the results obtained were, that—

1. Within an hour and a-half to an hour and forty-five minutes after the puncture is effected, the blood becomes so charged with sugar that it begins to pass off in the urine. The excretion of sugar attains its maximum during the third hour, then decreases, and terminates about the fifth or sixth hour.

2. It would seem that when the sugar in the blood amounts to 0.5 per cent. it begins to be excreted by the kidneys.

3. After the puncture there was a slight increase in the quantity of carbonic acid expired, but the author doubts whether that is to be ascribed to the oxidation of sugar.—*Siebold* u. *Kölliker*, *Zeitschr. für wissench. Zoologie*, 1853, v., 123.

ON THE MOLECULAR CONSTITUTION OF TANNIN AND GALLIC ACID.

BY M. E. ROBIQUET.

In my last investigation on gallic acid fermentation, I have left undecided the question as to whether tannin is a simple isomere of gallic acid, or a combination of gallic acid with a hydrocarbon similar to sugar or gum. The following facts which I had observed were not sufficient to decide the question. Whatever method is adopted for converting tannin into gallic acid, the transformation is never complete; a part of the tannin is altered and converted into an amorphous and mucilaginous substance possessing some of the properties of gum. If we operate by means of fermentation this substance is found in the liquors, but if the conversion is effected by means of diluted sulphuric acid, a substance similar to humic acid is produced at the same time as the gallic acid, and we are naturally led to think that the sulphuric acid has resolved the tannin into gallic acid and a gummy substance which is afterwards carbonized. It may be added, that by no process, whatever care may be taken, is it possible to produce a quantity of gallic acid that shall be more than half the weight of the tannin employed. This last fact, the uniform result of experiments, is much relied upon by those Chemists who believe in the pre-existence of gallic acid in tannin in the same way as benzoic acid is supposed to exist in hippuric acid. The formula for tannin assimilates to that for gallic acid dried at 212° Fahr., consequently, if the latter is but an isomeric transformation of the former, the product obtained in gallic acid should at least weigh as much as the tannin used. I say at least as much, because, as the transformation takes place in water, the gallic acid obtained is more highly hydrated than that dried at 212°.

But on examining the facts more closely it is found, that in converting tannin into gallic acid it is impossible to avoid the decomposition of a large portion of the former, and it is evident that the tannin is changed as a whole and is not split in two. When once it is thus modified the tannin is no longer susceptible of conversion into gallic acid, but is transformed into an amorphous mucilaginous substance. It is on this account that the gallic acid made by Scheele's process is not even equal to half the weight of the tannin contained in the galls used. For the same reason also, the tannin, already in an altered state, contained in oak bark, yields no gallic acid.

The following experiments appear to me to confirm these views:—

An aqueous solution of pure tannin was submitted, in a close vessel, to the action of pectase, at a temperature ranging from 77° to 86° Fahr., for eight days. The small quantity of tannin not yet attacked at the end of this time was precipitated with gelatine, and the gallic acid with neutral acetate of lead. After standing for twenty-four hours the complex precipitate was completely separated from the supernatant liquor, which was clear and colourless. This liquor was tested with Soleil's polarizing apparatus, but there was no sensible change in the colour of the doubly rotating plate, clearly indicating that there was not the smallest quantity of sugar or of gum present. To be still more certain, I decomposed the acetate of lead contained in this solution with sulphuretted hydrogen, and after filtering it, carefully evaporated the clear liquor. There was no residue left after the evaporation, although I used 200 grammes of liquid.

Thus it would appear that tannin does not contain sugar nor gum, nor any other similar principle, in combination with the gallic acid. When, under the influence of the pectic fermentation, or of sulphuric acid, tannin is transformed into gallic acid, there occurs a simple molecular change accompanied by hydration, just as cane sugar under the influence of yeast is transformed into grape sugar, before its conversion into alcohol and carbonic acid.

It remains for me to confirm this view of the subject by a minute analysis of all the tannates and gallates which can be obtained of constant composition.—*Journal de Pharmacie.*

TWENTY-FOURTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—LIVERPOOL.

The appointment of officers for the various Sections, and other preliminary business having taken place, the Association met in the Philharmonic Hall at eight o'clock P.M., on Wednesday, September 20th, when the President, the Earl of Harrowby, delivered the usual inaugural address.

The opening of St. George's Hall, which was celebrated by a concert, an oratorio, and a soirée, gave unusual *éclat* to the meeting of the Association, and the numerous objects of interest in and around Liverpool formed an additional attraction to the Members. We shall not, however, enlarge upon these proceedings, but confine our report to a brief notice of the subjects which came under discussion in the sections connected with Chemistry and Pharmacy, and which we defer until our next number.

AMERICAN PHARMACY.

BY EDWARD PARRISH.

Having in a recent number* directed attention to the principal duties and responsibilities of Druggists and Apothecaries, and the community of interests which grows out of them, and endeavoured to illustrate the advantage of a unity of purpose and action among those engaged in these responsible and important duties ; it is the design of the present article to advert to the present position of the trade, and to some of the objects to which its energies might be turned with advantage, reserving for a future essay some hints towards the best means of effecting a thorough and effective organization.

The natural enemy to the profession of Pharmacy is the quack. Of all the species of this parasitic genus (some species of which infest every profession), the most characteristic and well defined is the manufacturer of secret medicines or nostrums ; depending upon ignorance and credulity for support, the medicine quack is interested in suppressing the growth of intelligence among the masses, of science and a high code of honour among Apothecaries and Druggists. His interest would be promoted by reducing every drug store to an agency for patent medicines, or a store for general merchandizing, and every Pharmaceutist to a mere salesman and shopkeeper. He would have the public draw their ideas of medical practice from the newspapers, which he has bribed into the propagation of his favourite ideas. His profound philosophy has succeeded in so simplifying this complex human organism, that all the mysteries of pathology and therapeutics vanish before his magic compound. There is no need of a Materia Medica beyond the ingredients which it contains. No need of a physician to direct, or an apothecary to prepare, a medicine for the diseases which his charm can so soon dispel. This philosophy he preaches with the zeal of a propagandist through the many-tongued newspaper press, and editors whose office is to cultivate the public mind, and to sow therein the seeds of knowledge and virtue, are, with some honourable exceptions, waked by the potent agencies behind the scenes, into strains of high encomium and unmerited praise.

What wonder, then, that as a profession, dependent upon public patronage for support, we are completely prostrate ; that we scarcely can, if we would, act a manly and independent part. The Druggist must make a living ; this is the great motive power in his as in every other business, and in many instances, his bread and butter would fail, if, eschewing all quackery, he should hold up, by example and precept, a dignified testimony to his honest convictions. It is true that he may keep a tolerably clear conscience, as men can in almost any pursuit, by a sort of compromise between interest and duty. He may neutralize his actions with Q. S. of words, but the compound formed proves a feeble antidote to quackery, and certainly cannot be labelled consistency.

That this is the position of the great majority of Druggists in regard to quackery, is well known ; I believe it is mainly the result of our past neglect to avail ourselves of the advantages within our reach, and may be entirely obviated, and the profession of Pharmacy raised to its true dignity and importance, by uniform and well-directed efforts in the future.

Druggists everywhere enjoy the most intimate relationship with the public. Acquainted by study and long familiarity with those potent agents provided by nature for the relief of pain and cure of disease, they share with the physician a peculiar and distinguished place in the confidence of those with whom they come in

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* See *Pharmaceutical Journal*, vol. xiii. p. 619.

contact, in the line of their business. They may, to a great extent, give direction to the current of popular favour, and if possessed of the requisite knowledge and capacity to ascertain the constituents of the various nostrums they are called upon to supply, they may not only strip these of their false pretensions, but from the resources of the pharmaceutic art, may supply equally valuable standard remedies. It is, indeed, one of the duties our profession owes to the public, to supply every legitimate want, without even the apparent necessity of a recourse to the productions of the empiric.

The relations of the Druggist with the Physician, if properly maintained, would be found to give him an immense advantage in his warfare with quackery; so long as he pursues his calling with a just regard to the rights and interests of the medical profession and the public, and lends the weight of his influence against the common enemy, he will have the active support of all wise and liberal physicians. In strengthening the hands of these, he will be rearing for himself the strongest defence against the destructive competition of the unprincipled quack.

The intelligent and honest Pharmaceutist, in the pursuit of his legitimate business, will always enjoy the esteem of the community, while the quack is held in disrepute by a large class of the wiser and more conservative people; success even in imposture may draw with it the plaudits of the fickle crowd, who regard money as a fit substitute for honest merit, but to those thinking and knowing men, whose opinions give direction to the under-current of public sentiment, the thrift which follows industry combined with high and honourable principle, is a more certain passport to an honourable position than all the wealth that can be acquired by the charlatan or quack.

Let us then, with a hopeful reliance upon the strength of our cause, labour to rescue our honourable and useful profession from the embrace which has so long choked out its vitality and cast reproach upon its character, and in good earnest seek to infuse into it a vigorous and manly spirit, which shall result in its independence, its growth, and improvement.

To this end, our first great movement must be to organize. This step, we may indulge the hope, will soon lead on to every needful reform, frequent comparison of sentiment will gradually induce a more uniform practice throughout the country, often recurring social intercourse will awaken interest in each other, and a bond of union will be developed, co-extensive with the organization; besides these social and ethical advantages, the scientific and business character which will be imparted to our intercourse will tend to the common advantage, ideas which are capable of being individually profitable and advantageous, will become common property, the asperities of competition will be worn off, and an enlarged and liberal spirit begin to be realized, which will scorn unworthy tricks of trade, and seek the welfare of the profession at large, as well as the more selfish pursuit of individual advancement.

Without considering in detail the reforms which may prospectively grow out of an extended and thorough organization, among which the suppression of quackery stands conspicuous, it may be well to refer to some of the objects most immediately claiming the attention of those comprising the existing organizations; prominent among these is the education of the next generation of Apothecaries. This object is of paramount importance in connexion with the advancement of the profession and the suppression of quackery. Although a scientific education is not indispensable to success, nor even to eminence, yet it is undoubtedly an immense advantage, and experience proves that those who avail themselves of it, are generally better Apothecaries than those who do not. The position of the writer enables him to come to this judgment intelligently. As an agent of the College of Pharmacy in procuring situations for its graduates and others, he has become aware of the immense advantage of its diploma to those who possess it; as a general rule it is a sufficient passport to any station in the business which may be vacant, so that, although a diploma is, perhaps, sometimes overrated, yet no young man who expects to devote himself to the drug, and especially the apothecary business, should think of dispensing with so important an aid to his success.

In connexion with this subject of education, the question will soon arise, how far the multiplication of Colleges of Pharmacy will conduce to the advantage of the cause. The expense to the student residing in a distant locality, of a long journey and residence for two winters in Philadelphia or New York, in attendance on

lectures, constitutes a great obstacle to the extension of this advantage. Candidates for the drug business are very often in the humble walks of life, and unable to meet so heavy a drain upon their slender resources in anticipation of any means of revenue from their business; and yet as an encouraging sign of the times, it may be mentioned that rapidly increasing numbers annually seek these advantages in Philadelphia. Against the establishment of numerous schools of Pharmacy, at present, there lie many objections, founded upon the difficulty of maintaining them as yet, and upon the almost inevitable lowering of the standard of graduation consequent upon this kind of competition; but it can hardly be doubted that in the future, should the stimulus of our national and subordinate organizations be steadily maintained, the demand for pharmaceutical education will require the services of numerous scientific teachers in different and widely separated localities.

In connexion with pharmaceutical education, there are many subjects which will be found to press themselves on the attention of our organizations. The selection of suitable candidates for apprenticeship, with the requisite preliminary education; their careful training in the shop, the course of reading upon elementary science, which will be best adapted to prepare them for the College, should all be determined upon, with the best lights we can command. The establishment of preliminary schools, laboratories, and libraries, in connexion with local organizations, the obligation of the employer to furnish facilities for study, and of the student to avail himself of them, will have to be so insisted upon as to render effective the work of reform now begun. We should encourage teachers capable of giving direction to the work of education to enter this field. Let our enterprising young men aspire to impart scientific knowledge. Who is so capable of instructing the Physician as well as the Pharmaceutist in Materia Medica, Chemistry, and Pharmacy, as the well-educated Apothecary? who, by his pursuits, and the tastes that grow out of them, is so peculiarly connected with those departments of knowledge which are common to a medical and pharmaceutical education? If we would reach the position to which we are entitled, we must cut loose from that vassalage to Physicians, which has been too much encouraged and still keeps us down. Let us do our own teaching, and wherein we are the equals or the superiors of our medical brethren, let us not fail to assert our claims. The profession of Pharmacy lacks self-respect, and this is one reason it is not more respected by the public.

A measure fraught with a high degree of interest and importance, as calculated to promote an improved condition of our art, and to lead to an honourable emulation among its practitioners and students, has already been suggested in the American Pharmaceutical Association; it has for its object the offering of prizes for the best essays, both theoretical and practical. The subjects should be selected with a view to drawing out all degrees of scientific attainment, and a wide publicity being given to the papers in connexion with their author's name, would operate as a further incentive to competition in this very important line of effort. Those which require illustration, and which are connected with the display of apparatus and of improved processes, should be read publicly at the annual meetings, an additional charm, connected too with practical advantages, would thus be imparted to these gatherings.

The cultivation of a pharmaceutical literature among ourselves, which shall make pharmacology, instead of a secondary branch of medical knowledge, a distinct department of science pertaining to a distinct profession, is an object greatly to be desired and promoted by every legitimate effort. In connexion with this, we should not overlook the utility of diffusing among the people a knowledge of the true relations of Pharmacy. The experiment would well repay a trial of purchasing a place in the popular newspapers wherein correct views should be diffused as a sort of antidote to the puffs of quackery. This, of course, would require great skill and judgment; it should be done without the appearance of antagonism, without any pointed allusions, but in a manly and dignified spirit, with a direct view to diffusing a knowledge of the true nature of the healing art, and of the injurious consequences of too free and indiscriminate use of medicines. The Druggist and Physician, unlike the quack, have nothing to fear from the diffusion of light among the people, and I believe in this would be found our strongest weapon against quackery.

In considering the best plan for organizing the profession of Pharmacy we are met at the outset with the fact, that from the first suggestion of an extended organization two different views have been entertained, one looking toward the formation of local societies, colleges, &c., which should be duly represented in a national

congress, whose members generally should be accredited as delegates; and the other proposing the immediate union of all well-disposed Pharmaceutists into a National Association, without regard to location or previous organization, the influence of which should be exerted for the improvement of Pharmacy throughout the whole country, and, as fast as circumstances will allow, in promoting the organization of local societies on the same general plan and with similar objects in view.

The origin of the first convention accounts in part for the prevalence of the first-named view. The discrepancies occurring at the different ports of entry in the administration of the law for the inspection of imported drugs and medicines, led to a united action of the different incorporated colleges of Pharmacy, to endeavour to fix standards of purity for the various leading medicines passing through the custom-houses, and thus, as far as these legally authorized institutions could influence the policy of the different special examiners of drugs, to produce the uniformity of action among them that would be desirable. For this object, involving as it did many delicate questions requiring knowledge and experience to settle them aright, and in which grave differences of opinion would be sure to arise, and the sanction of majorities, *pro* and *con.*, be sought, and in which a sort of official force was designed to be imparted to the decisions, there were strong reasons for requiring that the conventions should consist of carefully selected representatives from established societies. The object and scope of the American Pharmaceutical Association was, from the first, widely different from this. In the Philadelphia College of Pharmacy, where the idea of such an organization originated, it was proposed at the time of selecting delegates to the convention in New York for the above purpose, that the delegates should suggest holding a convention at a future day, with a more general object in view—a convention in which all well-disposed Druggists should enjoy an opportunity to mingle and compare sentiments upon their common duties, responsibilities, and interests, and originate plans for the improvement of their art and the advancement of their professional interests.

The convention of 1851, in New York, entertained this proposition, and issued an invitation confined to delegates from existing Pharmaceutical organizations to attend, in the following year, in Philadelphia; but the convention of 1852, as soon as the question of organizing came before it, evinced a wider and more liberal spirit, adapted to the more extended field of labour which seemed opening before it, and, as a result, adopted the present section of the constitution relating to members.

And yet this section must be regarded as a sort of compromise between the more progressive and ultra conservative ideas of members. For although, *practically*, it seems to have opened the door to all rightly disposed Pharmaceutists to enter the organization by pursuing the rather awkward and sometimes difficult preliminary steps laid down, yet in the Code of Ethics, which is made a test of admission to membership, a clause is inserted which would, if *strictly construed*, keep out some of the most interested and efficient members. The obligation "to discountenance quackery," although one which will certainly be increasingly felt by members as they become imbued with the prevailing spirit of the Association, has never impressed itself as a duty upon many whose aid we desire to invoke in our earliest efforts. It is mainly by the sale of quack medicines that many Druggists subsist, who yet desire a reform in their business, and would be glad to co-operate in the laudable objects of the Association. In view of these considerations the writer is led to advocate a cordial welcome into the association of all Druggists, Apothecaries, and Chemists who desire self-improvement, and are willing to identify themselves with the general progressive movements growing out of such an association. Let us abolish all tests of membership, and trust to the force of sound principle and the contagion of good example to spread through our ranks a higher and better standard of practice.

By the more complete incorporation of the popular element into the national organization, we may hope to extend its usefulness to localities which would otherwise be unrepresented at its meetings. We shall be able to extend the system of regular apprenticeships throughout the west, and, through the employers, to incite in apprentices a disposition to advance their own interests and those of the profession at large, by higher scientific attainments and more thorough practical training. The Pharmacopœia, as a standard of practice, we may hope will be more generally used. The petty jealousies that keep apart those whose interests are similar, may be expected to melt away, in a great measure, before the *esprit de corps* which the

Association will seek to foster and maintain, and the diffusion of theoretical and practical knowledge by the reading of prize essays and the discussion of scientific and business topics at the meetings will be more widely useful in proportion as the doors are thrown open to all who are disposed to join and attend upon the Association at its migratory meetings.

As the sphere of the National Association is extended, we may anticipate that the local organizations, which were sought in the first instance as a primary object, will gradually take place as a secondary result, and these growing out of the parent stem, will be more completely assimilated to it and to each other, than as though independently organized each on its own basis.

If each of the twenty-five towns in the United States, in which there are at least ten Druggists and Apothecaries, were to contain a Pharmaceutical Society auxiliary to the National Association, the influence of the profession of Pharmacy would soon be felt over the entire country.

The organization of Druggists, Chemists, and Apothecaries into local societies, however small, is then an object of the highest utility; and one to be kept constantly in view. The most potent motive for organization would be found in self-interest. There is scarcely a town in which a united effort of Druggists might not so elevate the character of the trade as to make the business of *all* more lucrative and more respectable, without materially abridging the independence of *any*.

The evils of unrestrained competition and want of united action seriously affect the profits of our business. 1st. In the undue reduction of prices—the greatest bane of Pharmacy. 2nd. In the sale of quack medicines in place of standard preparations of our own manufacture. 3rd. In the failure to secure from Physicians a due regard to the rights and immunities of Apothecaries.

Suppose a half dozen Druggists, who supply a town and its vicinity mainly with medicines, to enter in good faith into a compact to keep up, or, if necessary, to elevate the standard of prices, so as to be amply remunerative, adding to this a determination to compete with each other only in the improvement of the character of the business. The advantage would soon be experienced by the public in an improved Pharmacy; Physicians would find it expedient to give up the preparation of medicines to those to whom it legitimately belongs; the sphere of each qualified Pharmaceutist would be extended, the business would begin to *pay*; quack medicines would be found less profitable to deal in than the standard preparations, and the public mind would soon begin to yield to the united and steadily directed effort of the Apothecaries, and the Physicians, their powerful allies, in turning back the tide of quackery. New demands would soon grow up, in supplying which, new sources of profit would arise, and ultimately the desire for self-improvement, if not the necessity for it, would lead to a closer and more effective union, which would find in the great national organization occasion to affiliate with other and longer established Associations.

Let us not then begin by measures calculated to arouse the prejudices, or wound the interests of any. Let us not too much despise self-interest as the strongest motive we can invoke to draw together those we seek to unite. Once present this motive in all the force of which it is capable, and organization, both local and national, will be the result. From this organization alone we may expect to grow those extended and philanthropic views and measures which will challenge the respect of the nation at large, and give character and influence to the *Profession of Pharmacy.—American Journal of Pharmacy.*

CORRESPONDENCE RELATING TO THE EARLY CLOSING MOVEMENT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having occupied the Chair at the Morning Meeting of Chemists' Assistants, held at the Freemasons' Tavern on the 8th ultimo, it is but fair to suppose that I, in common with others who were present, am responsible for its proceedings, and it is with no intention of repudiating any of the resolutions which were carried on that occasion that I trouble you with this note (for I cordially approved every one of them), but solely for the purpose of expressing my individual disapproval of a circular which has recently been issued to the Assistants by Mr. Lilwall, the Hon. Secretary to the Early Closing Association.

With the highest appreciation of the zeal, ability, and sincerity of purpose of that gentleman, I cannot but feel that the tone of his note is far from conciliatory, and assumes the prevalence of a spirit of antagonism between Master and Assistant, which I know, and which you also know, happily does not exist. I am quite certain that both employers and employed are alike sensible of the mutual advantages that will follow an abridgment of the present tedious hours of business, and if some little delay occurs in carrying out this desirable object, it is occasioned, not from the want of a desire on the part of the masters, but from the intervention of difficulties inseparable from a change such as the one now contemplated.

I have heard it stated, that by the distribution of the circular before referred to, the Assistants have "cut their own throats," and that many of our most respectable Chemists who were formerly favourable to their views, have now determined to resist what appears to them to be a combination of a hostile and insubordinate character. I take it for granted, Sir, that the Chemists of London are men of education, I assume that by such education they have acquired enlarged views and liberal feelings, and therefore I will not believe, that because some few inexperienced young men have done an indiscreet thing, they, *for so invalid a reason*, will hesitate to carry out an object, the principle of which they have already recognized to be good.

I am, Sir, your obedient Servant,

Oxford Street, Sept. 21*st*, 1854. J. WHITMORE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I sincerely sympathize with those who are endeavouring to curtail the hours of business, and at the same time fully concur in the wisdom of your remarks, and that reference *must* be had to locality in fixing the time, and that if all we would have cannot be obtained, we should get all we can, in the hope that so long as we move in the right direction, we shall reach the desired goal at last.

This is a late neighbourhood, and I fully believe that what can be done here can, with equal propriety, be done everywhere. To the present time all have kept their shops open till eleven o'clock or half-past every night. You will see by the enclosed notice that we intend to be a little more rational and close entirely at ten. I do hope ere long we shall close at nine o'clock. I tried to make this arrangement now, but finding I could not obtain the whole reduction, I accepted, with proportionate pleasure, the first instalment.

In justice to those who have joined with me in this movement, and as an indication of general feeling, I am bound to say that *all* agree heartily to the necessity of some alteration, and fully half would be glad to make it nine o'clock. One or two were solicited who refused, but their opposition was regarded as so unimportant that it formed no obstacle to the general plan.

Hoping that others will show their earnestness by action, and that before long I may be able to give a more favourable report of this district,

I am, Sir, your obedient servant,

11, *Union Place, City Road, September* 21, 1854. S. HASLAM.

(The following is the notice referred to.) "Notice to the Public.—EARLIER CLOSING OF CHEMISTS' SHOPS.—The undersigned having mutually agreed, beg most respectfully to inform the public, that on and after the 1st of October next, their shops will be entirely closed at ten o'clock every night, Saturdays excepted. It is respectfully and earnestly requested that in every possible case their friends will supply themselves with medicines, &c., during the ordinary hours of business.

"September 19th, 1854:—S. Haslam, 11, Union Place, City Road; J. Haycock, City Road; G. Meaden, 26, Ratcliffe Row, Nelson Street, City Road; J. R. Pottle, 20, Bath Street, City Road; John Kay, 70 A, Old Street; Alonzo Augustus Wildbore, 78, Old Street; Henry Bond, 11, Cross Street, Hoxton New Town; Thomas D'Aubney, 2, Rydon Terrace, Shepherdess Walk; H. H. Mason, 120, Old Street, St. Luke's; George Eade, 39, Goswell Street."

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Allow me, through the medium of the October number of your valuable Journal, to inform the Pharmaceutical body of Great Britain, that all the Druggists of this island (eighteen in number) unanimously resolved, on Friday last, to close

their establishments at 8 P.M. during the six winter months, and to express the hope that such a spirited and praiseworthy example will speedily be followed by all the Chemists throughout the kingdom.

I remain, Sir, your obedient Servant,

13, *King Street, Jersey, September*, 1854. W. R. WELLMANN.

We have also received a letter from Mr. Symes, stating that the following Chemists have resolved upon closing their shops, on and after the 1st of October, at nine o'clock every evening during the week, and entirely on Sundays:—Mr. Court, Regent Street; McDougall and Co., 174, Regent Street; Mr. Whitmore, 125, Oxford Street; Mr. Cooper, 26, Oxford Street; Wilkinson, Bridge, and Co., 27, Regent Circus; Mr. Wilcox, 336, Oxford Street.

LEOPOLD GMELIN.

LEOPOLD GMELIN belonged to a family which for four generations had been actively engaged in the pursuit of Chemistry. Johann Georg Gmelin, apothecary at Tübingen, who was born in 1674 and died in 1728, had three sons, all of whom devoted themselves to Chemistry and the allied sciences. Johann Conrad Gmelin (born 1707) was a physician and apothecary at Tübingen; his grandson, Christian Gottlob Gmelin (born 1792), is now Professor of Chemistry at the same place. Johann Georg Gmelin, the younger (born 1709), practised as a physician at St. Petersburg, where he was made Professor of Chemistry and Natural History, but is chiefly known by his travels in Siberia (1738 to 1745); he afterwards returned to Tübingen, where he was appointed Professor of Chemistry and Botany, and died in 1755. The third son, Philip Friedrich Gmelin (born 1722), succeeded the last mentioned in his Professorship, and died at Tübingen in 1768; he was the father of Johann Friedrich Gmelin (born 1748), Professor of Natural History and Botany at Tübingen, and afterwards of Chemistry at Göttingen, and the grandfather of the distinguished man who forms the subject of this notice.

Leopold Gmelin was born at Göttingen on the 2nd of August, 1788. From 1799 to 1804 he attended the Lyceum at Göttingen, and in the summer of 1804, his father's lectures on Mineralogy. In the autumn of the same year he went to Tübingen, where he practised chemical manipulation in the pharmaceutical laboratory of his near relation, Dr. Christian Gmelin (the son of Johann Conrad Gmelin, and father of Christian Gottlob Gmelin), and attended Killmeyer's lectures on Chemistry.

In the autumn of 1805 he returned to Göttingen, where he devoted himself with zeal to all branches of medical science, but especially to Chemistry, for which he attended Stromeyer's lectures: he also studied mathematics. After passing a distinguished examination, he went, in the summer of 1809, to Würtemberg, and thence to Switzerland, which he traversed in all directions, hammer in hand. From the autumn of 1809 to Easter, 1811, he remained in Tübingen, and then went to Vienna, where he visited the hospitals, and carried out, in Jacquin's laboratory, the greater part of the experiments which form the basis of his Doctor-dissertation "On the Black Pigment of the Eye." He left Vienna in the spring of 1812, and went to Italy, where he remained till the spring of 1813,—chiefly at Naples, but for some time also at Rome. The observations and collections made in these journeys supplied the chief material of the chemico-mineralogical investigations which formed the subject of his "Habilitation-schrift" at Heidelberg.

On his way back to Göttingen he stayed some time at Heidelberg, where the Professor of Chemistry, George Succow, being then recently dead, Gmelin was encouraged to give lectures on Chemistry. Availing himself of the opportunity thus presented, he obtained the *venia docendi* in Heidelberg, spent the remainder of the summer at Göttingen, making the necessary preparations for his new duties, and in the autumn of the same year began his career as an academic teacher in Heidelberg, which he afterwards pursued with zeal and success for nearly forty years. Twelve months afterwards he was appointed Extraordinary Professor of Chemistry. His celebrated "Handbook of Chemistry" was then already begun. In the autumn of 1814 he went to Paris, and occupied himself chiefly with practical researches in Vauquelin's laboratory. Two years afterwards he won the heart and hand of Luise Maurer, the daughter of a clergyman in the neighbourhood of Heidelberg, and thereby laid the foundation of a domestic happiness which continued without interruption to the end of his days. By this marriage, which was blest

with three daughters and a son, Gmelin became completely domesticated in Heidelberg; and for the sake of his wife, who was unwilling to quit the beautiful scenes of her home, he even declined the honourable and lucrative appointment of Professor of Chemistry at Berlin, whither he was invited in 1817, to succeed Klaproth, who died in that year. He was soon afterwards made ordinary Professor of Medicine and Chemistry at Heidelberg. Some years afterwards, in 1835, he declined, for similar reasons, an equally honourable and advantageous summons to fill the Chair of Chemistry at Göttingen, preferring to remain in his adopted home, although his emoluments there were much less than they would have been either at Göttingen or at Berlin.

In 1841 he made an excursion to Oldenburg, where his eldest daughter had been some months married, and there, on the 1st of October, he celebrated his "silberne Hochzeit," the twenty-fifth anniversary of his marriage. His hair had then become grey, but his frame still retained all the vigour of youth.

But he rarely indulged himself with recreations like this journey; indeed, in the latter portion of his life he was so completely engrossed with the gigantic labour of preparing the fourth edition of his "Handbook," that he became quite neglectful of his health. Often, after many weeks' untiring exertion in the lecture-room, in the laboratory, and, most of all, at the writing-desk, he would barely allow himself an hour's recreation in the twilight for a walk over the neighbouring hills.

In 1848 he had an attack of paralysis, which though it only deprived him for a while of his power of action, nevertheless destroyed the freshness and vigour of his manner. From that time a dark cloud seemed to overshadow him, ready at any moment to discharge the storm. But he still worked at his "Handbook" with untiring assiduity, as shown by the volumes which have since appeared. In 1850 he was again attacked by paralysis, which obliged him to resign his professional functions. He still, however, remained active in the cause of science, and laboured earnestly at the second volume of the "Organic Chemistry," which he completed in May, 1852. But from that time his powers, both mental and bodily, rapidly declined; an insidious disease of the brain was steadily gaining ground; and soon there was nothing left of Leopold Gmelin but the shadow. Even in this state he exhibited the greatest anxiety about the appointment of a worthy successor to his Professorship; and when he heard that Bunsen was to succeed him, his suffering countenance was lighted up with joy, as if he had received a positive assurance of his own recovery. In the spring of 1853 it became evident that his end was approaching, and he died on the 13th of April, in the sixty-fifth year of his age.

The most striking feature of Gmelin's character was his thorough conscientiousness, and the purity and truthfulness of mind thence arising. He was, in the fullest sense of the word, an *anima candida*,—a man never satisfied with anything that may just pass for truth, but striving earnestly after that which is really true. This principle regulated his scientific inquiries, his conduct as a teacher, and, most of all, his moral and social character. In his scientific researches he thought only of science,—not of anything external to it. Free from ostentation, and rather keeping in the background than putting himself forward, he never sought for effect or transient display, but only for solid facts and the real progress of knowledge. As a teacher he exhibited the same absence of display and pretension, and, though not particularly eloquent, he won the confidence of his pupils by the depth and conscientiousness of his teaching, and the paternal solicitude with which he watched their progress.

But it was in his family circle—in the midst of his children and grandchildren—that his character shone forth in all its beauty. His fresh, harmonious, unsophisticated nature, enabled him at once to win the hearts of children; he played with them like one of themselves, was never tired of giving advice and instruction, and showed the greatest delight at any remark or question which exhibited intelligence or desire of knowledge. He felt deeply all the joys and griefs of those who were dear to him; no sacrifice for their sakes was too great; and, while he gave them everything, he exacted nothing for himself. The same kind, truthful spirit and generous sympathy he likewise extended to his friends, among whom were a great number of excellent and distinguished men from all circles of life. Such a man was sure to gain the ready confidence of all who approached him. There was no artificial or assumed manner to separate from that which was real and permanent in him,—no conventional medium to be looked through in order to arrive at his

real nature. His politeness, which he never laid aside even in the most familiar household intercourse, was the outpouring of a friendly and benevolent spirit, and required no peculiarity of manner to recommend it ; it went hand in hand with the almost excessive modesty which was one of the greatest ornaments of his character.

To the world at large, however, Gmelin is known only by his scientific discoveries and writings. His original researches in Chemistry are numerous ; they are all of high character, and as complete as the means of investigation existing at the time of their publication would admit. His Doctor-dissertation, "On the Black Pigment of the Eye," was published in 1812 ; his Habillitation-schrift, "On Hauyne and minerals related to it, together with geognostic observations on the mountains of ancient Latium," in 1814. In 1820 he undertook, in conjunction with Tiedemann, a series of experiments on digestion ; and in 1826 and 1827, these two philosophers published their celebrated research, entitled "Die Verdauung nach Versuchen."

But the greatest service which Gmelin rendered to science,—a service in which he surpassed all his predecessors and all his contemporaries,—consists in this :—That he collected and arranged in order all the facts that have been discovered in connexion with Chemistry. His "Handbuch der Chemie" stands alone. Other writers on Chemistry have indeed arranged large quantities of material in systematic order ; but for completeness and fidelity of collation, and consecutiveness of arrangement, Gmelin's "Handbook" is unrivalled. It is quite in accordance with the extraordinary simplicity and truthfulness of his nature, that in this work, as in his other writings, he disdains all ornament of style, and aims at truth alone, which everywhere gushes out towards the reader like water from a rock. In the endeavour to depict with accuracy the almost boundless field of chemical science, he condenses all the known facts in the smallest possible space, but nevertheless contrives to present a complete picture of them. His accurate acquaintance with chemical science in all its breadth and depth, his comprehensive knowledge of languages, his untiring industry, and a tenacity in carrying out a plan once adopted, which shrank from no difficulties, fitted him above all others for carrying out such an undertaking. The wonderful strength of his memory, and a rare power of comprehension and description, enabled him to review in thought a large quantity of material, and mark out its principal divisions, after which he carefully distributed the several fragments of matter in their proper places. Detached and long-forgotten observations of other chemists were often indebted to Gmelin for first giving them their true value, inasmuch as he put them in their proper places, and showed their connexion with other observations. While other large Manuals of Chemistry,—that of Berzelius for example,—give merely the subjective view which the author takes of the science, stating of the observations of other chemists only so much as he may consider true and valuable, and the consequences which he may be inclined to deduce from them, often in opposition to the opinions of the authors themselves,—Gmelin sets the example of putting together, in a purely objective view, and on the authority of the several investigators, all that has been observed within the domain of Chemistry,—not, indeed, withholding his own opinions, but placing them side by side with those of others, and never suppressing the latter. Other chemical manuals may, indeed, be compared to sketches made by hand, in which the fidelity of representation depends altogether upon the idiosyncrasy of the delineator ; but Gmelin's "Handbook," in each of its editions, is a Daguerreotype of the science at the time of its appearance, and gives the pith of individual chemical investigations with such fidelity and completeness as in many cases to enable chemists to dispense with reference to the original memoirs. Moreover, it has often directed attention to deficiencies and contradictions, and thus given rise to new investigations. It has been widely influential in extending an accurate knowledge of Chemistry, not only in Germany, but wherever the science is cultivated. The first edition of this great work, which appeared in 1817-1819, included in a comparatively small space the whole extent of chemical science as then known ; the fourth, which was the last prepared by Gmelin himself, was published from 1843 to 1852, and comprehends, in five well-filled volumes, the whole of Inorganic Chemistry, but, unfortunately, only a small part of Organic Chemistry. It is from this edition that the English translation, now in course of publication under the auspices of the Cavendish Society, is made. The additions made by the translator bring the work down to the existing state of chemical science at the time of publication of each volume.—*The Quarterly Journal of the Chemical Society.*

TO CORRESPONDENTS.

B. S. (Leeds).—Solution of arsenic cannot be sold as "Fly Water," without complying with the terms of the *Sale of Arsenic Act.*

A Member (Nailsea). — See page 146 of the present number. The word *only* should have been inserted in our last, page 105.

E. T. D. (London).—(1.) *Syrupus Zinci Iodidi.* Iodine, ʒiv.; Zinc (finely divided), ʒij.; Water, f. ʒiv.; agitate till the liquor is colourless, and filter the solution into f. ʒxij. of simple syrup previously reduced by boiling to f. ʒviij.—Dr. A. T. Thomson. —(2.) *Syrupus Ferri et Quinæ Iodidi.* See Vol. xi., page 431.—(3.) *Syrupus Ferri Iodidi et Manganese.* Vol. xiii., page 88.—(4.) *Syrupus Ferri Phosph. Comp.* Vol. xiii., page 628.

M. P. S. (Belper).—See Vol. xii., page 314.

A. C. G.—We never heard of pills called by any such name.

T. S. H. (Truro).—By the rule of proportion. Tables of the equivalents of the two descriptions of weight are to be found in most works of Chemistry and Pharmacy.

A. D.—(1.) The *Memoir of Dalton* is published by the Cavendish Society and supplied to members only. Terms of subscription one guinea annually.—(2.) *Life of Sir Isaac Newton*, by Brewster, published by Murray.

G. W. (Mile End Road).—108 parts of standard silver would produce 170 parts of the nitrate.

J. D. (Torquay).—We do not know how to prepare the nasty fly paper; and do not aspire to the accomplishment.

A Member (Plymouth).—Specific gravity bottles for fluids are sold by all the makers of Chemical apparatus, at various prices, from 2*s.* or 3*s.* upwards.

E. F. R. B.—(1.) It is not lawful for a person not duly registered under the Pharmacy Act to exhibit any sign implying that he is a member of the Society. He is liable to a penalty of £10.—(2.) Animal Charcoal is used for bleaching oils and fats; also chlorine and exposure to light.

A Druggist (Liverpool).—Castor Oil.—The remarks referred to are scarcely worth notice. It is well known that drugs may be bought at any price, that some articles bear more profit than others, and that the aggregate returns in the drug business are, in a majority of cases, barely sufficient to cover expenses, without allowing anything as *remuneration* for close confinement, in the service of the public, seventeen hours a day besides Sunday and night-work.

Early Closing.—We have received several letters, some of which are anonymous, on this subject, which already occupies as much space as we can afford in one number.

The Marylebone Literary and Scientific Institution will commence the session with a meeting, to be held on Monday evening, the 23rd of October, when the subject will be—"The Influence of Literary and Scientific Institutions in promoting the Early Closing Movement." The meeting will not be confined to any particular class; but assistants, apprentices, and pupils residing in the neighbourhood are generally invited. Tickets of admission may be obtained of the Secretary, at the Institution, 17, Edwards Street, Portman Square.

We have received from Mr. Hopley, of Titchbourne Street, a printed circular (from Paris) on "Guarana ou Extrait de Paullinia," a medicine which has been much recommended as a remedy for Typhus, Dysentery, Diarrhœa, and Cholera. Specimens of the drug were exhibited at the last Conversazione of the Society at Bloomsbury Square.

We have to acknowledge the receipt of The Yearly Journal of Trade, 1854-5.

Obituary. — We have received a letter from Mr. James Jeffery Strange, announcing the decease of his father, Mr. James Strange, late of Queen's Row, Pimlico, in his 55th year, on the 17th of September, of a sudden spasm of the heart. Mr. Strange was one of the founders and supporters of the Pharmaceutical Society.

Erratum.—In our last number, page 105, line 10th from the top, *for* "prepared by," *read* "*prepared only by.*"

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. V.—NOVEMBER 1st, 1854.

THE LIBRARY OF THE PHARMACEUTICAL SOCIETY.

At the time the Library of the Pharmaceutical Society was originated, it was supposed that it would be a regular place of resort for Members and Associates, as a library of reference during the day, and a scientific reading-room in the evening. The numerous complaints that had been made by young men of the want of books, and the general expression of a desire for improvement, justified this anticipation. For a considerable time the gas was lighted every evening, and the librarian was in attendance for the accommodation of the aspirants for scientific knowledge. The collection of books was not large in the first instance, but it comprised an ample supply of standard works and periodicals adapted to the wants of the Pharmaceutical student.

Before the Library was opened to the Members, many inquiries were made respecting the proposed regulations, the hours of attendance, and the facilities for improvement which it would afford, and, judging from the interest expressed on the subject, it might have been doubted whether the space occupied by the Library would accommodate all the candidates for its advantages.

When the time arrived, however, the influx of readers was not overwhelming, a moderate number came occasionally for reference, and a few attended in the evening to read. By degrees the number diminished, the Library ceased to be a subject of conversation and inquiry, and after a time the evening readers almost entirely discontinued their attendance. It not unfrequently happened that for several consecutive evenings the gas and the fire were lighted, and the librarian or his deputy was alone in his glory, his occupation being gone.

While the "lamp of knowledge" was thus flickering in its socket, the Council were endeavouring to fan it into a flame, by urging Associates and Apprentices to study, and from time to time adding further supplies of books to the already valuable collection.

These efforts were unsuccessful. The lamp went out—the evening attendance having ceased, the gas was turned off, and the fire discontinued.

This desertion of the Library by those who had been so anxious to possess the privileges which it afforded, was a source of regret as well as surprise to those who had exerted themselves in providing the desired accommodation. The only explanation which could be given was the fact that personal attendance was inconvenient, on account of the ordinary engagements of business, and that unless the books could be circulated so as to be available at the homes of the Members and Associates, the Library would be of comparatively little service to those for whose benefit it was intended.

The Council had always looked forward to the establishment of a circulating library, and for this purpose intended, as soon as the funds of the Society should justify it, to provide duplicate copies of those works which might be required for circulation, retaining the original Library as a library of reference. But the limited extent to which the books were used in the library being taken into consideration, together with the desire expressed by many Members for the accommodation of a circulating library, the Council resolved at once to make arrangements to meet the existing demand. Regulations for this purpose were adopted, a catalogue prepared, and the books (with the exception of certain rare and bulky volumes) were at the disposal of the Members and Associates at their own residences.

In the last Annual Report the result of this experiment was stated, from which it appeared that the average number of volumes taken out during the year did not exceed three per diem.

The collection of books has been considerably increased within the last two or three years. The Council continue to add new works as they come out, and numerous donations of books have been received. The Library now comprises all that the Pharmaceutical Chemist can desire for reference and study. The books (with the small exception above mentioned) may be borrowed by the Members and Associates according to the regulations published in the printed catalogue, of which copies may be obtained of the librarian.

Notwithstanding these endeavours to promote scientific improvement by affording facilities for study, the expectations with which the arrangements were made have not been realized. The accommodation in the Library is but little taken advantage of, and the demand for books is very limited. The most charitable construction which can be put upon this circumstance, and the only one which points to a remedy, is the supposition that the late hours of business are the cause of the apparent indifference to the privileges offered. This evil is not worse than it has been for a long series of years. In fact, the hours have of late been to some extent curtailed, and a further reform is in contemplation. The purpose for which this change is proposed is to give young men more time for the acquirement of that scientific knowledge which their profession requires, and which is necessary to ensure their future success. In many localities the hours of business have been reduced, the shops being closed at nine instead of eleven, and if the experiment should be found successful, it is likely that a general improvement will take place.

The Council of the Pharmaceutical Society have not officially taken any part in this movement, although individual efforts have been made to promote it, and the re-opening of the Library of the Society in the evening will test the sincerity of those who ask for more leisure for the purpose of study and intellectual improvement. If simultaneously with the liberation of Assistants from business at an earlier hour, the Library should become a regular place of resort—if the demand for books should increase in proportion to the time granted for study, there will be every reason to rejoice at the success of the experiment. But if such symptoms of industry and desire for improvement should not be apparent, the young men who are the parties most interested will be themselves responsible for the failure of the efforts to increase their comforts and promote their future success in their profession. The Library is open every evening, except Saturdays, from 8.30 until 10.30.

THE PHARMACEUTICAL MEETINGS.

There are two motives which should induce the Members of the Pharmaceutical Society to attend the Evening Meetings—First, to receive; Secondly, to communicate, information. Most of the subjects which are brought under notice relate to processes, preparations, materials, or apparatus, directly or indirectly connected with Pharmacy. Some of the papers contain detailed descriptions of new chemical tests, improved preparations, prevalent frauds, or medicinal plants. The authors of such communications confer a benefit on the profession by publishing the result of their investigations, the reading of which occasionally gives rise to interesting discussion. In other cases, the object of the communications is not so much to convey novelty or original information, as to elicit the opinions of the Members on subjects in which they have had practical experience. Occasions not unfrequently arise in which it is desirable to clear up a doubt or reconcile conflicting opinions, with regard to the interpretation of some of the instructions in the Pharmacopœia, or the nature and strength of preparations not yet officinal, although occasionally ordered in prescriptions, and likely to be brought under the notice of the Pharmacopœia Committee. In such cases, the Pharmaceutical Society is (or ought to be) the authority to be consulted, and the Pharmaceutical Meetings afford the proper and legitimate

opportunity for arriving at the desired result. We say this ought to be the case, and it would be so if the Members at large were influenced by that *esprit de corps* and professional ambition which might have been expected to prevail under the circumstances in which the Society is placed.

The appointment of a Pharmacopœia Committee in connexion with the Society will have the effect of giving additional importance to the Pharmaceutical Meetings, this being the direct medium of communication with the Members. Several subjects practically interesting to the Pharmaceutist will shortly come under discussion in relation to improvements or additions likely to be suggested to the College of Physicians in anticipation of another edition of the Pharmacopœia. We may mention as examples; concentrated infusions, expressed juices, vegetable extracts, distilled waters, syrups, tinctures—all these and many other preparations will in their turn be considered by the Pharmacopœia Committee, and will furnish materials for discussion at the Evening Meetings for a long time to come. In such discussions almost every Pharmaceutical Chemist might participate, giving his opinion on matters in which he has had experience, or in other cases deriving information from the experience of others. Here will be perceived the direct connexion between the science of the profession and the manipulations of the trade.

If the Members generally would attend, or contribute in writing such observations as their practical knowledge might suggest, these meetings might be taken to represent the talent and experience of the Society. At several of the early meetings more than a hundred Members attended, besides many medical men and professional Chemists. At that time meetings for the scientific discussion of Pharmaceutical subjects were a novelty. The Members having been in the habit of considering the business merely a trade, were not prepared to take an active part in scientific deliberations. Nearly fifteen years having elapsed, during which period Pharmaceutical education has been progressing, and the trade has been gradually acquiring a professional character, there is no excuse for apathy and inactivity in those who are now recognized as the representatives of Pharmacy, and who have a position and character to support.

The public utility and professional importance of the Pharmaceutical Meetings as a means of developing the scientific resources of the Society, ought to be a sufficient inducement to the Members to come forward with spirit in aid of so good a cause. But if it be necessary to make a more direct appeal to other motives, we need only observe that those who desire to enjoy distinction and patronage in their business, will be more likely to attain this object by identifying themselves with a scientific society, and giving proof of their practical knowledge and experience, than by absenting themselves from meetings of this description, and limiting their ambition to the literary notoriety derivable from shop-bills, describing nostrums prepared only by the writer of the puffs, and liable to stamp duty as quack medicines.

THE MEDICAL PROTECTION SOCIETY.

This Society has commenced hostilities against Chemists in Hull. A conviction has been obtained against Mr. Joseph Brownridge: penalty, with costs, £30. The defendant has applied for a new trial, on the ground that the verdict was against evidence. The fact that he visited the patient, prescribed, and furnished the medicine, is not in dispute.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*)

Elected August, September, and October.

MEMBERS.

Glasgow	Jaap, John
Ipswich	Anness, Samuel Richard
Liverpool	Evans, Henry Sugden
	Fisher, William Henry
	Wharrie, Decimus
Manchester	Parkes, John Pryor
Southampton	Dixon, William
Spalding	Betts, George William

MAJOR EXAMINATION.

Gooch, William Philip	St. Neot's
Johnson, George	Birmingham

MINOR EXAMINATION.

Brewer, John William, N. T.	Oakhampton

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH.	TOWNS.
Bird, Daniel Landon	Mr. Wilson	Canterbury
Brice, William Webb	Mr. Rook	Sittingbourne
Chambers, William	Mr. Dresser	York
Coulson, Henry	Mr. Coulson	Scarborough
Eland, Charles Fowler	Mr. Telfer	Oxford
Harley, Edward	Mr. Foster	Ludlow
Harrison, Alfred Charles	Mr. Edwards	Great Russell Street
Power, Thomas Marler	Mr. Williams	Nottingham
Smith, Frederick	Mr. Foster	Ludlow
Smith, James William	Mr. Coulson	Scarborough
Walker, Joseph	Mr. Witherington	Worcester

PHARMACEUTICAL MEETING,

Wednesday, October 4th, 1854.

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

Donations to the Library and Museum were announced as follows:—

The Quarterly Journal of the Chemical Society, from the Chemical Society.
The Literary Gazette, from the Publishers.
The Chemist, from Mr. Highley.
The Journal of the Society of Arts, from the Society of Arts.
The Journal of the Photographic Society, from the Photographic Society.

Eight specimens of Peruvian Bark, Bark of Exostemma Peruvianum, and Bark of a species of Esenbeckia, from Mr. J. E. Howard.

Specimens of Rochelle Salt in different stages of its manufacture, from Mr. Huskisson.

Specimens of Hydrate of Potassa and Soda, from Mr. Collins.

Bark of Styrax officinale, from Mr. D. Hanbury.

Two samples of Siberian Rhubarb, from Mr. A. Faber.

African Cubebs, whole and in powder, and the essential oil, from Messrs. Desnaux and Co.

DISTRIBUTION OF PRIZES.

The Prizes awarded to the successful competitors at the Examinations in the classes of Chemistry and Pharmacy, and Botany and the Natural History of Drugs, at the conclusion of the last session, were distributed as follows:—

CHEMISTRY AND PHARMACY.

EXAMINER, MR. REDWOOD.

PRIZE .....Mr. John Attfield.

CERTIFICATES OF MERIT... 1. Mr. John D'Oyle
2. Mr. George Clayton

Questions for Examination:

1. Describe the compounds of Antimony and Arsenic, and the methods by which the latter may be detected when mixed with organic bodies.
2. What is the distinction between *statical* and *dynamical* electricity? How are these two modifications of the electrical force excited? Explain the phenomena of electrical induction.
3. What are the best excipients for making Balsam of Copaiba, Oil of Pimento, and Creosote, respectively, into pills?
4. Explain the conditions most favourable to the production of pure Liquor Potassæ.
5. Give a sketch of the processes generally adopted for the ultimate analysis of organic bodies.
6. Give the chemical history of Alcohol and Ether, and describe the supposed relation of these bodies to each other.
7. Describe the processes for the preparation of Cyanide of Potassium and Cyanate of Ammonia; explain the relation of Cyanate of Ammonia and Urea, and the products of the decomposition of urea by heat.
8. Describe the processes for the preparation of Muriate of Morphine, Meconic Acid, Narcotine, and Sulphate of Quinine.

BOTANY AND THE NATURAL HISTORY OF DRUGS.

EXAMINER, MR. BENTLEY.

PRIZE..... ..... Mr. John Attfield.

CERTIFICATES OF MERIT... 1. Mr. Brewer.
2. Mr. S. Harvey.

Questions for Examination:—

1. Describe the structure of Spiral, Annular, Reticulated, Pitted, Scalariform, and Laticiferous vessels.
2. What are the characters which distinguish a Root, a Rhizome, a Tuber, a Cormus, and a Bulb.
3. Describe the process of Respiration in Plants, and compare the changes which it produces upon the atmosphere with that of the Respiration of Animals.
4. What do you understand by determinate and indeterminate Inflorescence? Mention the varieties of Inflorescence which belong respectively to each, and describe and give examples of the following kinds:—viz., a Spike, Locusta, Corymb, Panicle, Umbel, Capitulum, Cyme, and Verticilalster.
5. Describe the chief modes of valvular dehiscence which occur in Compound Fruits.
6. Give the essential characters of the following natural orders: *Ranunculaceæ*, *Malvaceæ*, *Rosaceæ*, *Umbelliferæ*, *Compositæ*, *and Liliaceæ*. Enumerate the officinal substances which these orders respectively yield.
7. Name the barks numbered respectively 1, 2, 3, 4, and state their characteristic physical characters.
8. Describe the mode of obtaining Scammony, and state the characters by which its purity may be ascertained.
9. What is Cinnamon? how is it procured? and what are the characters which distinguish it from Cassia?
10. Describe the physical characters of the seeds and bark of *Strychnos Nux-vomica*. Mention the characters by which the latter may be distinguished from Cusparia bark.

11. Describe the method by which Opium is procured. Enumerate the various commercial varieties of this drug, and state the characters of good Turkey Opium.
12. Explain the mode by which Aloes is obtained in the greatest purity. Mention the plants from which the officinal kinds are supposed to be derived, and state briefly their chief distinctive characters.

ON THE *CUBEBA CLUSII* OF MIQUEL, THE BLACK PEPPER OF WESTERN AFRICA.

BY WILLIAM F. DANIELL, M.D., F.R.G.S.,
Honorary Member of the Pharmaceutical Society.

This pepper, indigenous to many of the mountainous countries of equinoctial Africa, appears to have been known in England from an early date. Brought to Europe by the Portuguese at the time when the exclusive traffic of the African coast was vested in their hands, it constituted one of their chief commercial exports, of which they contrived to secure the monopoly for several years, until their domination was subverted by the jealous interference of other maritime nations. The Portuguese government, however, soon discovered that a much more lucrative commerce might be established from the East Indies, in similar kinds of pepper, equally abundant, and of superior quality; and in order to avert any restriction, or check to their introduction, prohibited the further importation of the species from Western Africa. The Dutch, English, and French traders, nevertheless, purchased considerable quantities, which they transmitted to their respective countries, the original importers confining themselves to its barter, for the produce of other parts of the coast where it was unknown, or less abundant.

This plant, or rather the fruit, has been described by various writers on Materia Medica, and confounded by some with the *Cubeba officinalis*, on account of the attachment of the berries by partial stalks, being common to both species, from which peculiarity originated the primary designation of *Piper caudatum*, and subsequently that of *Guinea Cubebs*. The older authors, however, while clearly distinguishing this from the true Cubebs, have likewise remarked that a near approximation was afforded to it, in the similarity of habit, fruit, &c.

Clusius, an eminent professor of botany in the University of Leyden, first mentions this production in his "*Exoticorum*," published in 1605, observing that it was received under the appellation of *Piper ex Guineâ*, and closely resembled Cubebs, of the racemes of which he furnished an illustration.* In the edition of Gerard's "*Herball*," by Johnson, dated 1633, the following outline is given of the African species:—"Another kinde of pepper is sometimes brought, which the Spaniards do call *Pimenta de rabo*, that is, pepper with a taile; it is like unto Cubebes, round, full, somewhat rough, blacke of colour, and of a sharpe quicke taste, like the common pepper, of a good smell: it groweth by clusters upon small stems or stalkes, which some have inadvisedly taken for *Amomum*. The king of Portingal forbad this kinde of pepper to be brought over, for feare least the right pepper should be the lesse esteemed, and so himselfe hindered in the sale thereof."† Parkinson, in his "*Theatrum Botanicum*," has indicated the difference between this and the ordinary Cubebs by the terms of *Piper caudatum racemosum* and *Piper caudatum orientale;* of the former he observes that, "about the yeare 1590 there was brought to Lishborne (Lisbon) by the *Portugale*, from some parts of the East Indies, which afterwards wee understood to be *Guinney*, a kinde of graine, which they call *Pimenta del rabo*, that is pepper with a taile, and grew many together on a long stalk."‡ Some doubt and confusion has

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* *Lib.* 1, *p.* 184. † *Lib.* 3, *p.* 1540. ‡ *Chap.* 45, *p.* 1605.

arisen in consequence of the names conferred by other European nations, on both these species of pepper being precisely similar, the Portuguese, now, as at a former period, retaining the general appellation of *Pimenta del rabo*, and the Spaniards that of *Cubebas*, or *Pimienta a cola*, to denote the *Cubeba officinalis*. The distinction, however, will be rendered sufficiently explicable, by deeming the same designations, when found in the works of the earlier African voyagers, to exclusively pertain to the *Cubeba Clusii*, Miq. Hence the following statement from Barbot, in his enumeration of the products growing in the vicinity of Sierra Leone, will become readily understood from this explanation:—"The *Pimenta del cola*, or *de rabo*, is also very plenty, long and taily, and better valued than the right pepper of Borneo, and for that reason prohibited in Spain, lest it should spoil the East India trade. The Portuguese carry it to the Gold Coast, where they mix it with Guinea pepper."* The same author has also remarked that similar kinds of Pimenta may be obtained from many other countries of Western Africa, and when purchased from Benin has been occasionally vended under the titles of *Benies*, or Benin pepper.

The *Piper Guineense* of Thonning, brought by the native merchants from the interior, and exhibited for sale in the markets of the Gold Coast, by the name of *Ashante pepper*, and sometimes employed by the people of Akkrah, under the term of *Dojvie*, in lieu of the common black pepper (for which it answered but imperfectly, owing to its bitterness), is doubtless this production or a variety of it, while the *Aserumbdrue* mentioned by Bowdich, the leaves of which were resorted to in Kumasse to reduce abdominal enlargements, is probably the *Pothomorphe subpeltata*, Miq., as also the *Ewelliwelli*, one of the sacred plants of the priests of the Gaboon river, whose leaves when rubbed on a fetishman, are reputed to enjoy the faculty of rendering him invisible.†

When resident at Ambriz in 1845, I noticed that no inconsiderable quantity, of apparently the same fruit, was brought by the slave-kabookas from the neighbourhood of M'bomma and other inland provinces of the Kongo, and offered for sale to the European factors on the coast, who however refused purchasing it, on account of the peculiar flavor. These berries are evidently the same which Ogilby in 1670 includes among other vegetable exports, procurable from the localities within the kingdoms of Angola and Kongo. In the brief description he furnishes, several of the details are incorrect, but others are sufficiently characteristic to establish its identity with the *Cubeba Clusii*, which he asserts grows to the height of three or four feet "with small and narrow leaves, whose fruit bears the resemblance of *coriander*, at first appearing in green knots, afterwards in blossoms, and, lastly, in a kind of small grain. These *Benies* grown ripe and dried in the sun, shrink like East Indian pepper, turning black and hard, and little differing from it in taste, only not so hot, which makes it pleasant to eat and fit to be used in all food. It grows much in *Benyn*, and many other places of *Nether-Ethiopia*."‡ Smith, in Rees' *Cyclopædia*, has confounded this pepper with the officinal Cubebs, in stating that specimens of the latter had been gathered by Afzelius, and his companion Borone, in leaf and fruit, so that no further doubt could remain as to the recognition of the plant, and, guided by this authority, Nees. v. Esenbeck, Ebenmaier, Stephenson, Churchill, and other authors, have likewise committed the same error. Lindley, however, subsequently pointed out that this kind of African pepper belonged to a distinct species, to which he gave the name of *Piper Afzelii* (or Guinea Cubebs), not perhaps being aware that a similar title had previously been conferred on the *Piper grandifolium*, Afz., by Rœmer and Schultes, and therefore to avoid any confusion that might otherwise result, it becomes necessary to retain Miquel's specific term of *Cubeba Clusii*, although of a later date.

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* *A Description of the Coasts of North and South Guinea*, *lib.* 2, *ch.* 3, *p.* 106.
† *Bowdich, Mission to Ashante*, *p.* 373 *and* 445.
‡ *Africa*, *p.* 556.

Humboldt has remarked that the *Piperaceæ* are very rare in tropical Africa; and Brown, in confirmation of his views, states that only three or four species were known, one of which was supposed to be the *Piper Cubeba* noticed by Clusius, or very nearly related to it.* Those that have been observed, are the *Peperomia lucida*, Lin.; *P. Vogelii*, Miq.; *Pothomorphe subpeltata*, Miq. (to which the above *Piper grandifolium* or *Afzelianum* has been referred), one or two varieties of the *Cubeba Clusii*, Miq., and some others, either unknown or not yet described.

The following characters of the genus *Cubeba* are quoted from Miquel's *Systema Piperacearum* (Roterodami, 1843, 8vo), p. 285. The description of *Cubeba Clusii* is taken from the same author's subsequent *Animadversiones in Piperaceas Herbarii Hookeriani*, published in the *London Journal of Botany*, 1845, p. 434:—

Cubeba.

"Cubeba Miq. *in Comment. phytogr., p.* 33. *tab.* 4. *fig. a. excl. spec.*

"Flores dioici, amentacei, sessiles. Masc. (in amentis minoribus), bracteis oblongis sessilibus imbricatis. Stamina 2—5, filamentis teretibus, antheris ovatis vel reniformi-cordatis, bilocularibus. Fem. bracteis peltatis persistentibus, subsessilibus, oblongis vel orbiculatis subtus sæpe hirtis. Ovarium sessile ovatum, stigmatibus sessilibus crassis brevibus vel brevi-lanceolatis 3—5 recurvatis supra hispidulis. Baccæ basi constricta pseudo-pedicellatæ subglobosæ. Pericarpium tenue. Semen subrotundum testa coriaceo-membranacea aut cornea. Embryo in apice albuminis farinosi sacculo crassiusculo turbinato vel subconico inclusus. *Frutices arbusculæve, scandentes, in India orientali, insulis Sundaicis, Mascarhenis, et Africæ oris australioribus, spontaneæ, sylvarum umbram præoptantes, ad montium regiones elevatiores non adscendentes, foliis petiolatis tri-multipli-nerviis, vel costulatis, membranaceis aut coriaceis, glabris aut pubescentibus, singuli sexus sæpe diversis, amentis ad caulium nodos oppositifoliis, masculis gracilibus, femineis fortioribus plerumque leviter curvatis, e baccis (fervidis) maturis pseudo-pedicellatis racemum simulantibus.*"

Cubeba Clusii.

"Piper Afzelii. *Lindley Fl. Med.* (1838), *p.* 314.

"Cubeba Clusii. *Miquel Syst. Piperacear.*, p. 304.

"Ramis teretiusculis, ramulis tetragonis vel tetragono-compressis, nascentibus petiolis foliisque subtus in nervis primariis pedunculisque tenerrime pubescentibus, foliis modice petiolatis, infimis ovatis æquilateris acuminatis basi æquali cordatis, superioribus majoribus lato-ellipticis acuminatis, æquilateris vel inæquilateris basi lato-rotundata vel obtusa modice inæquali excisis vel leviter cordatis, membranaceis, subtus pallidis, nervo medio paucicostulato, costulis 3—2 ad $\frac{1}{4}$ alt. majusculis patulo-adscendentibus, reliquis infimis et supremis tenuibus, pedunculo petiolum bis terve superante, amentis (fœm.) subpatulis curvatis, stigmatibus 3, baccis ovatis vel ellipticis acutis pedicellum æquantibus vel paullo superantibus. Hab. Fernando Po (Goderich Bay), Clarence (Frutex baccis rubro-fuscis.)

"Eandem hanc esse speciem, quam a *Clusio* jam commemoratam et a *R. Brown* ex Herbario Banksiano indicatam, inter dubias species olim enumeraveram, nullum quidem dubium, atque ita res in distributione geographica Cubebæ generis et Piperacearum in universum admodum memorabilis extra omne dubium posita est. Est autem hæc species arcte cognata cum reliquis congeneribus Africanis, *C. costulata*, *Borbonensi* et *Capensi*, habitus simillima, obiter intuenti vix diversa, accuratius autem observatu, characteribus solidis e foliorum nervatione et compage petitis certa species," &c.

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* *Vide Appendix, Tuckey's Congo, &c.*

Cubeba Clusii of Miq., the Black Pepper of Western Africa.

This climbling plant, usually found attached to the larger brushwood, or moderate sized trees of the forest thickets, is common not only to several of the coast regions, but flourishes equally in Bornou, Nufé, Yorruba, Fernando Po, Kongo, and other elevated countries of Western and Central Africa. It also grows abundantly in the mountain districts of Sierra Leone, from whence considerable quantities of the fruit are transmitted to the markets of the town, for sale during the dry season, where it can then be purchased at a cheap rate.

It flowers in the months of October and November, and the fruit ripens in February and March, but is frequently plucked in January, while in an immature state. The berries are at first green, gradually acquiring a brownish tint as they enlarge, and ultimately becoming of a dusky red, or reddish-brown, when they attain their full maturity. In their dry condition the cortical portion changes from a dirty brown to a greyish black colour, the variations principally depending on the degree of ripeness at which they were gathered. The racemes of fruit consist of an irregular number of spherical, or globose-formed seeds, in magnitude somewhat less than those of the ordinary black pepper, containing a whitish mealy albumen, externally invested by a fleshy and succulent coat, which slightly corrugates in drying, and connected by small or partial stalks, about $\frac{1}{6}$—$\frac{1}{3}$ of an inch in length, which adhering to the berry when detached from the cluster, has given origin to the early English term of *Tailed Pepper*. Their taste is camphoraceous, peppery, and moderately acrid, in a fresh state diffusing a rich aromatic odour, and leaving, when chewed, a slight cubeb-like and peculiar bitterness on the palate. Their flavor and other qualities, on the whole, appear to be more analogous to those of the *Piper nigrum* than of the *Cubeba officinalis*, and I have therefore considered it preferable to retain a prior English designation, to that of *African* or *Guinea Cubebs*. Some deviations in the fruit are perceptible, when procured from different localities to which they are indigenous; but whether these peculiarities are to be ascribed to the variations of soil, to the nature and place of growth, or to another variety of the same plant, cannot be precisely ascertained. The berries procured from the highlands of the Kongo, whether owing to their age or other accidental circumstances, are much harder and more pungent than the kinds from the coasts of Northern Africa, their cortical covering is smoother and less wrinkled, and the internal substance of the seed more pearly white and oleaginous. This product, known in Yorruba by the name of *Eré* or *Eeré*, was in former times occasionally brought to a large amount, from the mountain lands of that country, to the seaport towns in the Bight of Benin, and also to those in the Rio Formosa, from the Jaboo kingdoms, and hence probably the derivation of the local title of *Benin pepper*.

The berries and partial stalks of *C. Clusii* are in size about one-third less, but the racemes of fruit appear to be larger, and their cortical exterior more thick and succulent than those of the officinal Cubebs. Although more solid and compact in substance, and possessing an essential oil conjoined with a certain degree of acridity, they, nevertheless, appear to differ in their peculiar principle and active oleaginous constituent from ordinary cubebs. A careful analysis of the former fruit would, however, readily point out the distinctions.

Dr. J. D. Hooker has kindly favoured me with the following succinct diagnoses, in which the botanical features of these two species are clearly indicated:

"Cubeba Clusii. *Miq. Pip. p.* 304 *et in Hook. Lond. Journ. Bot. v.* 4., *p.* 434. *Flor. Niger. p.* 514.

"Folia ovata, elliptico-ovata, v. oblonga, acuminata, vix cordata, subæquilateralia, 3 nervia. (Exemplaria e Africâ occidentali tropicâ.)

"Cubeba officinalis. *Miquel Comm. Phyt. p.* 33, *Pip. p.* 285.

"Folia ovato v. lineari-oblonga, obtusa v. subacuta, basi profunde cordato-biloba, sub 5-nervia, ad apices obtusa. (Exemplaria Javanica.)

"The above are the diagnostic characters of the specimens in the Hookerian herbarium. The leaves of *C. Clusii* are much shorter, broader, with long

abruptly acuminate points, and small cordate more or less unequal bases; they are only 3-nerved at the base, the upper nerves are very variable in number, and are more or less spreading, sometimes almost at right angles to the midrib, at others almost parallel with it. In texture they are membranous in young specimens, and very coriaceous in old ones.

"In *C. officinalis* the leaves are larger, more oblong, blunter, very much broader at the base, which is often deeply cordate or 2-lobed; there are five or more nerves at the base of the leaf, and the upper nerves all run more or less parallel to the midrib."

The uses to which this pepper has been applied by the negroes of Western Africa are comparatively unknown. In some places (Sierra Leone) it is employed as a condiment to flavour their soups and other vegetable compounds, and elsewhere (Kongo) an infusion of the green fruit, leaves, or entire plant, constitute one of the component parts of those fetish potions which the Gangàs, or native doctors, attempt the cure of a manifold series of diseases. Whether it is endowed with the same peculiar properties as the Cubebs, is very questionable, for though genito-urinary affections are extremely prevalent among the Africans, yet so far as my limited experience extends, they do not exclusively resort to any portion of this plant for their cure.

Mr. Daniel Hanbury remarked that the new drug described by Dr. Daniell had been imported as Cubebs, under which name it was not subject to duty.

The Chairman said he had tried it as a condiment. It had a musty flavour, and was not agreeable to the taste.

AN EXAMINATION OF THE ALKALOIDS CONTAINED IN THE ENGLISH POPPY CAPSULES,

AND A NEW PROCESS FOR THE PREPARATION OF THE SYRUP.

BY MR. T. B. GROVES.

The preparation of syrup of poppies has so frequently been brought under the notice of the Members of this Society, that some apology is needed for again introducing it. This apology is best afforded by the fact, that the object desired, viz., an easy and inexpensive process for the preparation of the syrup in question, has not yet been attained, although many have tendered the results of their experience for the purpose. As my experience justifies me in adopting the process following, I publish it, that others may have an opportunity of criticising it, and of adopting or rejecting it, as their judgment may dictate. It must be acknowledged by all who have tried it, that the Pharmacopœia recommends a process that, conducted as carefully as it may be, rarely yields a satisfactory result, when the trouble and loss of rendering it bright is taken into consideration, and in addition its liability to fermentation. The latter may be checked, it is true, in some measure, by adding spirit, but this entails the serious disadvantage of precipitating gum, &c., and making it somewhat gelatinous—to such a degree, as I have found, that the syrup is unfit for the preparation of clear or transparent mixtures. To obviate these objections, the Paris Codex orders the use of an alcoholic extract of poppies—obviously incapable of being advantageously carried out, in this country, at the present price of spirit. Mr. Southall recommends that the capsules be exhausted by percolation with cold water, &c. &c. Not having tried this I cannot express a decided opinion, but, considering the almost horny structure of the capsule, I cannot but think that its exhaustion must by this process be very imperfect, and also that the difficulty of despumation is not altogether obviated. Messrs. Smith recommend that the liquor obtained by boiling the capsules as directed, be evaporated to a pilular consistence, and exhausted with rectified spirit—this solution, when deprived of spirit, to be used for dissolving the sugar. That which I recommend is but an improvement on the preceding, or at least is put forth as such.

In order to free the capsules of their seeds, I cut off their heads with a penknife, and can then, as all the placentæ are cut across, readily turn them out. The capsules, weighed without the seeds, are boiled in the required quantity of water, until sufficiently reduced, and then allowed to become *completely cold* before pressing. By proceeding thus, the whole of the liquor will be obtained bright, and undiminished by loss, as the whole of what would otherwise have been feculence, has passed through the press, and yielded a small amount of liquor. It is then carefully evaporated, at *once*, to the extreme limit directed ; and to it, when cold, is added one-third its volume of rectified spirit. It is now allowed to stand for some hours. By this means the mucilage, &c. will be precipitated in such a form as to inclose the feculence, and enable the whole to be pressed strongly, if only commenced cautiously. To effect this, I tie up the ordinary canvas press bag, and put the semi-solid mass into it, and allow it to drain completely; then transfer it to the press, and again allow it to drain, and afterwards place upon it the pressure plate. When this has ceased to produce any effect, the screw is cautiously applied until sufficient consistence has been attained to bear strong pressure. This does not take an unreasonable time, as a small stream may be kept up without danger of bursting the bag. The liquor obtained will be perfectly bright, and of course intensely bitter, and characteristic of the decoction of poppy. The spirit should be recovered by distillation ; and, although flavoured to some extent, may be used for tincture of opium, or for any purpose where flavour is not an object. I have always found the liquid to be turbid after distillation from a deposit of phosphate of lime, whilst the liquid from which it is deposited has an acid reaction. I am at a loss to account for this. A specimen is forwarded for inspection—the product of my last operation. The marc left in the press is of course as hard as a board, and retains but little of the liquid. I find that its amount varies considerably, and I think depends in a great measure upon the greater or less care taken during the evaporation. Thus its amount has varied between 28ʒ and 15ʒ, retaining a corresponding proportion of liquor, and influencing the result one way or the other. These weights were obtained from four Pharmacopœia quantities, and were weighed moist; when dry they weighed respectively 16ʒ and 12ʒ. A third operation gave the same results as the second. On the first occasion the evaporation was conducted rapidly and without sufficient care ; on the two last occasions the evaporation was conducted slowly and carefully. The liquor when made into syrup is perfectly bright, and even when diluted so as to prevent crystallization, keeps exceedingly well. In fact, I seldom prepare it more than once a year, on account of its being somewhat troublesome.

My first attempt to examine the liquor was confined to ascertaining the presence of morphia. This I succeeded in doing by precipitating a few ounces of it by carbonate of soda, and applying a gentle heat ; then allowing the precipitate to subside, collecting and drying it. This, when washed with hot alcohol and the tincture evaporated to dryness, gave a very small quantity of a substance that was rendered orange-coloured by nitric acid, blue by sesquichloride of iron. The quantity being quite insignificant, the experiment was not considered quite conclusive, and accordingly a larger quantity of fluid, 40ʒ, was set by for use, and a better process adopted for its analysis. It consists in evaporating the liquor, containing the alkaloid in solution, to dryness with an excess of magnesia, then exhausting the mass, when powdered, by boiling spirit, and finally evaporating again to dryness. The substances thus obtained are treated with acidulated water, filtered, and proceeded with as described. Proceeding in this way, I found that the first washing of alcohol, deposited on cooling slender silky crystals, and others of a more substantial kind. Finding that these readily dissolved when the liquid was warmed, the washing was continued until the liquor passed almost tasteless; and then all were distilled to recover the spirit, until but a few ounces remained in the flask, which was allowed to cool and stand by for some hours. A large quantity of crystals were

deposited. The liquid, when drained off from them, was evaporated to dryness and treated with dilute hydrochloric acid. Nearly the whole dissolved, the small quantity that did not was of a resinous character, and exhaled a strong and unmistakable odour of stale tobacco.

The crystals were then attended to, and were found to deflagrate when heated on platinum foil, and to leave on it an ash, having an alkaline reaction. This pointed to an organic body and nitrate of potass. They were found to be both soluble in boiling water, the organic body sparingly so; they were therefore readily separated by continued crystallizations. I should mention that the crystallization had been effected from an acid solution. The solution that had been set by, was reduced to small bulk and filtered hot; on cooling, crystals were deposited similar to those already obtained, consequently the operation was twice repeated, and the whole quantity of crystals rendered perfectly white by repeated crystallizations. The residual liquor being still bitter, was evaporated to a syrupy consistence, and allowed to remain some days undisturbed; by the end of this time, it had consolidated into a mass of crystals, which proved to be, in the main, hydrochlorate of morphia. I was certainly surprised at finding any at this stage, but suppose it to have been deposited in the first instance on the cooling of the spirituous solution, and that the mother-liquor of the first crystallizations had been used to dissolve the subsequent depositions from the acid liquor. The point not being considered important at the time, was not noted, and consequently I am not quite certain of it. After all the crystals had been removed from the solution, it was rendered alkaline by potass, and agitated repeatedly with ether, the ether being washed each time by diluted hydrochloric acid, and thus used again and again. A liquid of a very bitter taste was thus obtained, which, when evaporated to a syrup, and placed in a warm situation, crystallized partially, the crystals being imbedded in an amorphous brown mass, which could not by any means be induced to assume a definite form. The mass was therefore transferred to blotting-paper, and when sufficiently firm, was pressed between folds of the same; by repeating this process, viz., crystallization and pressing, several times, the crystals were obtained white and well formed, but unfortunately, aiming at still greater perfection, they refused to crystallize, and were ultimately lost. A smaller quantity, however, subsequently obtained from the mother-liquor by washing the blotting-paper, &c., and which, although not pure, are sufficiently characteristic, I have forwarded;—also a hydrochlorate and a nitrate. I believe them to be codeia. If so, I have no doubt that this alkaloid is, in proportion to the morphia, contained in greater quantity in the poppy capsule than in opium, a fact of some importance, as medical practitioners having patients susceptible of the peculiar influence of codeia, in producing irritation of the skin (which I have known to drive a relative of mine almost to frenzy), would not have recourse to syrup of poppies for a favourable substitute for opium. The liquor still continuing bitter after washing with ether, was warmed a little to expel traces of spirit and ether, and as a last resource, agitated with chloroform, not however with much expectation of good resulting. I was agreeably disappointed by observing the chloroform sink through the liquid highly coloured, and a flocculent substance floating on its surface. These were removed by a separator, and the solid strained from the liquid by a filter. The liquid yielded by evaporation a trifling quantity of residue, which did not prove to be of any importance. The substance, however, which floated on it proved to be morphia, almost in a state of purity, which was easily formed into pure white hydrochlorate, and is now forwarded as a specimen. The singular fact of chloroform removing morphia from solution in an alkali without dissolving it, brought to mind the circumstance I had observed when washing with ether, viz., that below the clear ethereal solution was a gelatinous stratum that I had rejected, and which now I have every reason to believe contained codeia in suspension; in fact, I have little reason to doubt it, as a small experiment with the pure salt convinced me that when agitated with excess of

potass and ether, the greatest part separates in that form. The circumstances are quite analogous, as both the morphia and codeia were in solution in the presence of an alkali before treatment with other solvents. What remained had but little taste, except the saline, occasioned by chloride of potassium. It was, however, evaporated to a syrup, and has since remained so, without depositing any other salt than that already mentioned. The acids that were originally combined with these bases I have not attempted to discover; the operation would be one of considerable difficulty, and, considering the unscientific treatment of the capsules, one of great uncertainty.

I will now briefly mention the principal reactions of the substances obtained, and conclude. That which was obtained by ether, I considered at first to be a single body, and treated it as such. I found that it was soluble in alcohol, ether, and acids, and precipitated from the watery solution by all alkalies, and not soluble in excess of either. It had moreover, a strong alkaline reaction with litmus, colouring it as markedly and permanently as would soda or potass. It was precipitated by tincture of galls. Sulphuric acid coloured it a rich red-brown, nitric acid a bright permanent yellow. Its other reactions were not important. I mention these, as now that it is known that the substance contained, besides the uncrystallizable body, codeia, it is possible, from a comparison of the reactions of the latter and of its mixture, to deduce the separate reactions of the substance with which it is mixed. That which I believe to be codeia, is not precipitated from solution by an alkali, added as cautiously as it may be. Codeia is known to be soluble in water. It is scarcely affected by sulphuric acid, and but faintly coloured by nitric acid of a pale yellow. Sulphuric and nitric acids combined produce a permanent orange colour. Its taste is bitter.

The substance I have marked A, and which I first obtained, is not a base. When crystallized from a solution containing free hydrochloric acid, the presence of the latter cannot be detected by nitrate of silver. It is bitter in taste, although from its sparing solubility in cold water, but slightly so. Tincture of galls produces a *doubtful* precipitation after some time. Nitric acid colours it for the moment of an orange-yellow, but it very soon becomes colourless. Sulphuric acid gives it a characteristic dark olive colour. The two acids mixed, not characteristic. As it presented some of the characters of narcotine, it was tried side by side with that body, prepared from opium, and crystallized from spirit, in the Society's laboratory in 1851. It was manifestly entirely different from it. Its solubility also clearly distinguishes it. I find it to be soluble in 360 parts cold and 120 parts boiling water, from which it crystallizes readily on cooling. I must apologize for this lengthened statement concerning it, by stating I have not been able to identify it with anything described in books I have access to. Should this subject be taken up by other persons, it would be obviously advisable to exhaust the capsules, finely divided, by gentle coction with acidulated water, and not by the fierce boilings and long exposure to heat and air usually adopted.

The Chairman, in expressing the thanks of the meeting to the author of the paper, referred especially to his investigation of the chemical constituents of the poppy capsules, which he trusted would prove a stimulus to others to pursue similar investigations. The process suggested for making the syrup was worthy of notice, but he had found much advantage in cold maceration and percolation instead of boiling the capsules. He had adopted that plan for many years. He bruised the capsules, exhausted them with cold water by displacement, and evaporated the infusion *in vacuo*. By this means, all the medicinal properties were taken up, and the syrup was not liable to ferment or spoil, as it was found to do when made in the ordinary way.

Mr. Davenport asked if he pressed the capsules.

The Chairman said pressure was not necessary. By using a proper quantity

of water for macerating the dry ingredients before commencing the displacement, the process was easily conducted, and the whole of the active principles were extracted. If too much or too little water were used, the result was not so successful.

Mr. MORSON said this was not the first time that an attempt had been made to separate the alkaloids found in opium from the poppy capsule. Experiments on this subject were made many years ago in France, an account of which was published in the *Journal de Pharmacie*, but to the best of his recollection the results were not very conclusive or satisfactory. It was evident, however, that the alkaloids found in opium were contained in the dried capsule of the poppy, although they could not be advantageously procured for commercial purposes from this latter source. Of this he had satisfied himself by experiment. Yet the English poppy yielded perfectly good opium. Samples of opium made in this country many years ago were not inferior to the best Turkey opium, and the only objection to English opium was the price at which it could be produced. But the juice obtained by decoction and expression from the dry capsules differed materially from that got by incision from the capsules while still growing.

The CHAIRMAN said, there could be no doubt that much more of the active constituents of certain plants was obtained by allowing the juice to exude from incisions made while the plant was living than would be got by expression from the plant after it was gathered. He recollected having this pointed out to him by an eminent botanist, Mr. N. B. Ward, with reference to some of the euphorbiaceæ, in which, if a leaf be cut in two while attached to the plant an exudation of milky juice takes place from that portion attached to the plant; but if the leaf be first separated from the plant, and then cut, no such exudation is observed from the cut surfaces, showing that the supply is mainly from the plant, and not from the leaf.

ZINC OINTMENT WITH BENZOIN.

Mr. REDWOOD directed the attention of the Meeting to some specimens of zinc ointment prepared with gum benzoin and benzoic acid. It was a source of considerable inconvenience that zinc ointment was liable to become rancid in a short time, and in that state it did not produce the desired effect when applied to the skin. It had been suggested that benzoin retarded this rancidity, and some experiments had been tried with this object. The ointment was made by stirring in benzoin with melted lard, in the proportion of TEN GRAINS of BENZOIN to AN OUNCE of lard. FIVE GRAINS of BENZOIC ACID had been added in the same way to AN OUNCE of lard with a similar effect. A question had arisen whether the benzoin prevented the rancidity or masked it, by imparting an odour to the ointment. He had, however, separated the benzoin from some ointment which he had received several weeks ago from Mr. Hills, and the ointment, although divested of its aromatic odour, was not at all rancid, while another specimen made at the same time without the benzoin had a strong rancid smell.

Mr. ALLCHIN had found recently that much of the oxide of zinc of commerce, although free from carbonic acid, was evidently prepared by precipitation. It contained a little sulphuric acid, and he thought this might cause the ointment made with it to become rancid more quickly than it would if made with the pure oxide.

Dr. NORMANDY inquired how it was ascertained that the oxide met with in commerce had been made by precipitation. Was it by a microscopic examination, or by observing its effect when used as a pigment? It was found that the precipitated oxide was not so opaque as that made by combustion, and therefore the latter was preferred for making zinc paint.

Mr. REDWOOD said, the oxide of zinc prepared by precipitation was a hydrate, and always contained some of the acid of the salt from which it had

been precipitated. When obtained from sulphate of zinc by means of ammonia it retained about 13 per cent. of sulphuric acid, besides 23 per cent. of water. It was obvious that the use of this product for oxide of zinc was quite as objectionable as the employment of what was more frequently sold for oxide of zinc, namely, the carbonate. Both the foregoing preparations were perfectly white, and he believed to this cause the preference given to them was due. The pure oxide, made according to the process in the Pharmacopœia, was not white, but had a slight yellowish tint, which appeared to be inseparable from it. The effect of the pure oxide, as an external application, was very different from, and far superior to, that of either of the white precipitated substitutes.

Mr. Bell said the preparation of the ointment with benzoin was an experiment, and the result would not be known for several months, as the question to be decided was how long the ointment when so prepared would keep without becoming rancid. In the mean time it was occasionally ordered in prescriptions as Unguentum Zinci (Benzoin), and the subject was introduced to the Meeting in order that any Chemist, to whom such a prescription might be taken, might know how to prepare it.

Mr. Davenport said it ought to be understood whether the ointment so prepared should be used when unguentum zinci was ordered.

Mr. Bell said decidedly not. It never was so intended; but during the progress of experiments on the subject, it was right that all Chemists should be in possession of the information.

Dr. Farre said the remarks just made had rendered unnecessary a caution which he was about to offer against using the ointment prepared with benzoin when zinc ointment was ordered. He took the opportunity of observing that the oxide of zinc of the Pharmacopœia was not described as white, but "*luteo-album.*"

The Chairman said the medicinal effect of the pure oxide was much superior to that of the oxide containing carbonate or any other contamination. The ointment was less liable to spoil, and it was more soothing when applied to the skin.

Mr. Bell wished to impress upon the meeting the fact that the manufacturers regularly prepared two kinds of oxide of zinc, the pure oxide, P.L., for those who desired to have it and would pay the price, and the ordinary or impure for those who preferred a whiter and a cheaper preparation. It was also necessary to attend to the quality of the lard, and not to keep the ointment too long. If all Chemists would attend to these suggestions, there need be no difference in the quality of the zinc ointment met with in different shops.

Mr. Davenport asked Mr. Bell whether there was not some secret in regard to the temperature at which the ointment was mixed? He had an idea that a particular temperature was important, and had observed that a better result was obtained by melting the lard.

Mr. Bell replied that he was not aware of any secret in the matter. The lard should of course be soft enough to admit of the oxide being uniformly corporated.

Specimens of

PREPARED LAMB-SKIN

Were laid before the Meeting. This manufacture has been contrived by Dr. Scott Alison, for the continuous application of moisture to the skin, by means of a soft, adhesive, thin, and elastic medium. The *prepared lamb-skin* is of two kinds: one kind is covered with an impermeable coating, intended to retard evaporation and retain heat, and is suitable when continuous moisture and moderate warmth are desired; the other kind is perforated in such a manner as to promote evaporation and to favour the escape of heat, and is applicable when moisture, relaxation, and cold are required. They are sold by Mr. Hamilton, 27, North Audley Street.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

Session III.—Meeting 1.—A meeting of the North British Branch of the above Society was held on the evening of Tuesday, 24th October, 1854, in the Rooms, 72, Princes Street, at half-past eight P.M., precisely; H. C. Baildon, Esq., President, in the chair. The following communications were previously announced, but we had not received the report of the meeting at the time of going to press :—

1. Opening Remarks, by H. C. Baildon, Esq. 2. Introductory Address, by Dr. Christison, F.R.S.E., and Professor of Materia Medica in the Edinburgh University. 3. The new Collodion Balloon will be shown by Dr. Stevenson Macadam.

The various donations and additions made to the Museum and Library throughout the summer will be laid on the table.

The Council recommend to the notice of Members, Associates, and Apprentices, the Evening Lectures on Chemistry, proposed to be delivered during the ensuing winter by Dr. S. Macadam.

The Library will be opened for the distribution of books on Thursday evening, the 2nd of November, from half-past eight till half-past nine P.M., and will be opened weekly at the same time for the like purpose. The Council have arranged that a regular supply of two medical periodicals, published once a week, shall be laid on the library table for the use of Members, Associates, and Apprentices ; but it is to be understood that these are not to be lent out or removed until a month has elapsed from the date of publication.

Edinburgh, October, 1854. J. Mackay, *Secretary.*

Lectures on Chemistry.—Dr. Stevenson Macadam, F.C.S., will commence a Winter Course of Lectures on Chemistry, in connexion with the North British Branch of the Pharmaceutical Society of Great Britain, on Friday, 3rd November, at a quarter-past Nine, P.M.

These Lectures will be delivered in the Rooms of the Pharmaceutical Society, 72, Princes Street, and will be continued on the Tuesday and Friday evenings during the six winter months.

Fee to Members, Associates, and Apprentices, £1 5*s.* Fee to Gentlemen not connected with the Society, £1 11*s.* 6*d.*

Edinburgh, October, 1854.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Friday Evening, October 6th.

MR. ABRAHAM, VICE-PRESIDENT, IN THE CHAIR.

Dr. Edwards delivered a lecture on "The Preparation of some Salts of the Organic Radicals, Amyl, Ethyl, and Methyl, recently introduced into Medicine."

He remarked, that as many organic compounds possess properties as active and persistent as inorganic salts, it is reasonable to suppose that they possess in general a nucleus or compound atom, which stands in relation to other elements as a metal.

The isolation of this organic base, or radical, is more or less difficult; for, generally speaking, these compounds are more stable both as basic or acid radicals, when combined with their inorganic relatives; and as many are liquid and some gaseous at ordinary temperatures, they cannot be examined with the same freedom, or maintained in so permanent a condition, as simple elementary substances.

It therefore often happens, that the nature of such radicals is best studied through their compounds, and in some instances so much obscurity is involved in their extraction, that the existence of the radical in its separate condition is almost unknown, while its salts and combinations form extensive and important objects of research.

In the study, therefore, of these compounds, we have difficulties more formidable than those which the routine of inorganic chemistry presents; for, in the examination of a metal, having obtained its reduction to a simple state, we find out its rela-

tion to other bodies by combination with known elements ; whereas, in the study of organic radicals, the process is often necessarily inverted, and from the most complicated relations we gradually reduce our compounds to as simple a state as the nature of the base will allow.

In classifying facts thus ascertained, it is sometimes necessary even to assume the nature of a body from the relations it bears to known substances, before its identity is ascertained or verified. And thus we still hold to the theory of organic radicals, held by Liebig, although other theories have been advanced equally capable of embracing the known facts necessary to their illustration.

On the debatable ground he did not enter, but held, that for the purpose of illustration and classification, the Ethyl theory is admirably adapted, this theory assuming that alcohol is the hydrated oxide of a radical or base, and that the salts with metalloids are formed by the substitution of other non-metallic elements for oxygen. By analogy, the salts of wood-spirit and potato-spirit are also grouped in series. Dr. Edwards explained the composition of all the principal compounds of these series, and showed the beautiful relation they all bore to each other. He then referred to the principal object he had in view in bringing the subject before the Association, viz., an account of the mode of preparation of some new salts of these organic radicals; several of which have lately been extensively employed by Dr. Turnbull, and found to possess most important physiological properties; some of them acting as local and general stimulants, and others possessing anæsthetic properties.

The mode of preparing iodide, bromide, cyanide, and acetate of ethyl the corresponding salts of methyl, and the iodide and acetate of amyl, were minutely explained and commented upon. The formula and mode of preparing one of the salts—iodide of ethyl—will give a general idea of the methods employed in obtaining these compounds.

Phosphorus is cautiously added to a mixture of alcohol and iodine and distilled at a gentle heat, the product is received into water and then agitated with more water, from which the heavy oily ether separates on standing. This is re-distilled with oxide of lead and chloride of calcium until the product is free from phosphorus and water.

The compounds with bromine are made from bromide of potassium and sulphuric acid, and the distillate rectified as above. The product is much smaller than that obtained as iodide of ethyl.

This is the salt which has been found most valuable as a remedial agent, patients being able to take, in the form of iodide of ethyl, a much larger quantity of iodine into the system than they could possibly bear if an inorganic iodide, such as the iodide of potassium, had been administered. Specimens of all the compounds alluded to were shown, and at the conclusion a vote of thanks was passed to Dr. Edwards for the very interesting and instructive lecture he had delivered.

Mr. Abraham exhibited several large diamonds belonging to Mr. Mayer. He had examined them with the following results :—

No. 1.....	1091.23 grs.	weight.....	3.0153 sp. gravity.
No. 2.....	395.83 "	.....	3.2354 "
No. 3.....	59.775 "	.....	3.5317 "

No. 1 had a porous appearance, resembling coke. Colour, brownish-black. No. 2 had a smooth surface and was blacker. They were both fragments, and presented no appearance of crystalline structure, though No. 1 had one side somewhat flattened.

They were also remarkable for their extreme hardness, beyond that of the ordinary diamond, so that no means of working them had yet been found. They were found in Bahia, in a bed consisting chiefly of oxide of iron. No. 3 was an ordinary diamond, distinctly crystalline. He thought the difference in the specific gravity tended to show that the two former were not, contrary to the received opinion that diamonds as found are always, fragments of crystals.

He also showed a large diamond set as a seal ring. It was of the twelfth century, and was remarkable as being engraved. In that respect he believed it was unique ; the hardness of the diamond presenting an almost invincible obstacle to its being worked in that manner.

Dr. Edwards presented to the Society copies of various papers read by him on different occasions.

The Secretary announced that the Pharmacy Class would meet for the first time this session on Monday evening next, at the Laboratory, Royal Institution.

THE ACTION OF IODIC ACID UPON THE VEGETO-ALKALIES.

(A communication made by R. H. Brett, Esq., Ph.D., to the Liverpool Chemists' Association, 5th May, 1854.)

Dr. Brett said his attention was first drawn to the subject, by endeavouring to find out some test which should readily detect the presence of quinidine in quinine; on this point he had come to the conclusion that there was no decisive test, but knowing the peculiar action of iodic acid upon morphia, the production of a brown colour from the liberation of iodine, he thought there might also be some reaction with quinine or any of the other alkaloids. Acting upon this impression he had made a number of experiments, which had resulted in showing most conclusively, he believed, that the reaction of iodic acid with nitrogenized vegeto-alkalies, was such as to distinguish them from all other organic substances. In the first place, he said, he would show its action upon a few of the alkaloids, and afterwards, its action upon other azotized and non-azotized substances, from both the vegetable and animal kingdoms, when a very marked difference in the results would be seen.

The doctor then placed a small portion of quinine in a capsule, and added about an equal portion of iodic acid, with a few drops of water. This mixture, on being gently heated, gave rise to a series of distinct explosions, accompanied by an evolution of gas, and it was to these explosions he wished to draw attention, for no other substance that he had experimented upon would produce them except the alkaloids. He repeated the experiment several times, substituting for the quinine, the alkaloids, strychnia, morphia, and narcotine, and in each case with the same results. He then showed its action upon other—both azotized and non-azotized—substances, not alkaloids, such as meconic acid, salicine, uric acid, gluten, &c.; but there was no explosive action or the slightest appearance of detonation, merely a calm liberation of iodine vapour.

He observed, he had experimented with solutions of iodine itself, but without any result, though he would not insist upon this with much force, as only a few experiments had yet been made; but as far as they had gone no explosive action had been observed. He had also mixed iodic acid with ammonia, but without any result. With regard to the theory of the decomposition which took place, and the cause of these explosions, his impression was that iodide of nitrogen was formed, but even its formation must be looked upon as an extraordinary circumstance, when we bear in mind the small quantity of nitrogen contained in these alkaloids; and what is more extraordinary still, the inability of any other nitrogenized body to produce the same reaction. If this explosive property should be shown to belong, by further experiment, as he had no doubt it would, exclusively to the alkaloids, it would be an important addition to our knowledge of these powerful medicinal agents; for instance, if we treat an unknown white substance with iodic acid, and get no explosion, we can say at once, that body is not one of the alkaloids, and as far as he had tried experiments upon the salts of the alkaloids, which were upon sulphate of quinine and muriate of morphia, he had found the reaction the same as upon the alkaloids themselves.

MANCHESTER CHEMISTS' CONVERSATIONAL SOCIETY.

[We much regret that the following was accidentally omitted last month.]

The Committee of the above Society are happy to announce the educational arrangements for the ensuing session which they have succeeded in making, for the benefit of the young men who are employed in the Pharmaceutical establishments of this district.

The elementary course of Twenty Lectures of last winter will be succeeded by a more complete course of Forty Lectures on Inorganic Chemistry, *specially adapted* to the requirements of the Pharmaceutical student, to be delivered by Professor Crace Calvert, M.R.A. of Turin, M.I.S.P. of Paris, F.C.S. &c. &c., in the Laboratory of the Royal Institution, assisted by Mr. Hunt, B.A., F.C.S., late of University College, London, on the mornings of Monday and Friday, at nine o'clock. The Introductory Lecture will be given by Professor Calvert, on Monday, October 16th. The fee for the Course is £1 1*s*., tickets for which may be obtained of the Secretary, Mr. Roberton, 111, Oxford Street. The number of young men who have already

signified their intention of availing themselves of this opportunity of acquiring instruction in their profession is highly encouraging, and the Committee earnestly hope that the privilege thus afforded will be largely appreciated by those for whose especial benefit it is provided. At the termination of the Course, Prizes and Certificates will be awarded to the most diligent students of the class.

It is believed that a short summer course on Botany will be arranged for next year.

The Committee have much pleasure also in announcing that the monthly evening meetings of this Society will be resumed on Friday, October 13th, when the prizes to the successful students of last session will be prescnted. The paper for the evening will be on the Materia Medica of the Pharmacopœia.

To Professor Calvert the Society is highly indebted for the lively interest which he has taken in its progress, and the valuable assistance he has repcatedly rendered to it.

JAMES ROBERTON, *Hon. Sec.*

REPORT OF THE FIRST MEETING FOR THE SESSION.

The first monthly evening meeting for the present session of the Manchester Chemists' Conversational Society was held at the York Hotel Buildings, to which Members of the Society and the Students attending the Lectures of last session were invited.

The President (Mr. Standring) opened the business of the evening by an interesting address, detailing the various efforts which had been employed in Manchester for the purpose of raising the standard of education of the young men who are employed in the Pharmaceutical establishments of this district. He viewed with satisfaction the desire which was unceasingly evinced by the young men for opportunities of study, and the means of acquiring a scientific knowledge of their profession, and believed that the "pressure from without" (the operation of the Pharmacy Act and the force of public opinion) would effect a great improvement in the rising generation of Pharmaceutical Chemists. He congratulated the Members on the prosperous condition of the Society, and on referring to the efforts of the Committee for completing the educational arrangements of the Society, which he believed would include, Chemistry, Botany, Materia Medica, and Practical Pharmacy, he stated the pleasure he felt in witnessing the response which had been made on the part of the young men.

Professor Crace Calvert expressed his satisfaction with the diligence and gentlemanly conduct of those who attended the class of last winter. He was deeply anxious that the education of the rising Chemist should be of a high order, and forcibly pointed out the advantages of a pecuniary kind, as well as those of position and high station, consequent on a scientific education and a higher standard of qualification. The answers at the examination of the two gentlemen to whom the prizes were awarded were highly creditable to them, and he hoped it would be a stimulus to increased exertion.

The President, whose liberality had provided the prizes, then presented them as follows :—

First Prize to Mr. Smith—with Mr. Lynch—*The Life of Dr. Dalton*, by Dr. Henry; with Redwood's *Practical Pharmacy*.

Second Prize to Mr. E. Watton—with Mr. Holyoake—Royle's *Materia Medica*.

CHEMISTS AND DRUGGISTS' INSTITUTE.

(COPY OF CIRCULAR.)

Wellington Chambers, Victoria Strect, Exchange, Manchester.

SIR,—I am requested to inform you that the Committee have now completed their arrangements for the delivery of a Winter Course of Lectures on Chemistry, and a Summer Course of Lectures on Materia Medica. The whole will comprise a course of Thirty-five Lectures : viz., Twenty-three on Chemistry, delivered by Daniel Stone, Esq., F.C.S., &c., and Twelve on Materia Medica, delivered by Alexander Somers, Esq., M.R.C.S. Eng., L.A.S., and Lecturer on Materia Medica at the Chatham Street School of Medicine.

The last course of lectures was attended by fifty-two members and pupils, with very great advantage and satisfaction, the majority of whom, unsolicited, have given in their names for a further course of lectures, and the additional promise of

support from others who have hitherto withheld their influence, has induced the Committee to give this course upon a scale of liberality greater than the last. The last course consisted of *twenty* lectures for the cost of 10*s.*, the present course will consist of *thirty-five* lectures at the cost of 15*s.*; and Certificates of Merit and Laboratory Practice will be granted in addition, free, to those pupils who offer themselves for examination at the conclusion of the lectures.

The Committee have also very great pleasure in informing the Apprentices, that a Gentleman of high standing in the trade has kindly and voluntarily offered a Prize, of value, to the best examination upon Materia Medica, and they hope it may be a stimulus to further exertion on the part of Apprentices to merit the good opinion of the Principals.

The Committee hope that you will use your influence on behalf of this Society, by encouraging and granting time to your Apprentices or Assistants to attend the lectures. From the very liberal scale of charges, it is evident, that unless a large number of pupils can be obtained, the Committee will be personal losers in their endeavours to improve the next generation of Chemists and Druggists.

From the circumstance of two lectures a week being inconvenient for the majority of gentlemen to attend, the Committee have determined to have the lectures delivered weekly, and the course on Materia Medica and Botany will be delivered in the summer, after the conclusion of the course on Chemistry.

A deputation will have the honour of waiting upon you in a few days, when they hope for your favourable support.

The Introductory Lecture will be delivered by Daniel Stone, Esq., on Wednesday, the 18th day of October, 1854, at the Rooms of the Society, at half-past Three o'clock in the afternoon, when you are most respectfully invited to attend.

The subsequent Lectures will be delivered at the Rooms every *Wednesday*, at half-past Three o'clock.

October 3rd, 1854. By order, JOHN HAMER, *Hon. Sec.*

ORIGINAL AND EXTRACTED ARTICLES.

ON THE LEAVES OF THE *COCA* OF PERU (*ERYTHROXYLON COCA*, LAMARCK).

BY DR. H. A. WEDDELL.*

(*Continued from page* 164.)

LET us now examine the properties of the Coca, after having glanced at the manner of employing it.

The Peruvian ordinarily keeps his coca in a little bag called *chuspa*, which he carries suspended at his side, and which he places in front whenever he intends to renew his *chique*, which he does at regular intervals, even when travelling. The Indian who prepares himself to *acullicar*, *i.e.* to chew, in the first place sets himself as perfectly at ease as circumstances permit. If he has a burden, he lays it down; he seats himself, then putting his *chuspa* on his knees, he draws from it one by one the leaves which are to constitute his fresh "quid." The attention which he gives to this operation is worthy of remark. The complaisance with which the Indian buries his hand in the leaves of a well-filled *chuspa*, the regret he seems to experience when the bag is nearly empty, deserve observation; for these little points prove, as I shall have occasion to repeat further on, that to the Indian the use of coca is a real source of enjoyment and not the simple consequence of want.

As the Indian deposits the leaves in his mouth he wets them by turning them over with the tongue, forming them into a sort of little ball, which he places against the cheek as a sailor does his tobacco. This done, he takes from his *chuspa* a little box which generally accompanies the coca, and removes from it a very small quantity of an alkaline paste, called *llipta*, which is the ordinary condiment to the leaf. The *llipta* which the Peruvians, and especially the Bolivians, are in the habit of using, is made of the ashes of the *Quinoa* (*Chenopodium Quinoa*) or of those of the common *Cereus*. The ashes of several other plants, however, are used

* Extracted from Dr. Weddell's *Voyage dans le Nord de la Bolivie*. Paris, 1853, 8vo, ch. xxix.

for the same purpose ; they are often sold in the markets in the form of little flat cakes. In some parts of America lime is substituted for them.

From the constancy with which the Indians employ an alkali with the coca, one might presume that it favours the solution of the active matter of the leaf ; but on this head we know nothing positive. Others have said that the *llipta* was intended to neutralize the acid* of the leaf ; but it is easy to convince oneself that the coca contains no principle of this nature in appreciable quantity.

The leaves of the *Erythroxylon* approach in shape and size those of tea, but they have never the dentated margin ; on the under side, a prominent and curved line on each side of the mid-rib serves to distinguish them from most other leaves known. When dried well, they are of a very pale green, deeper on the upper than on the under side ; their odour is then agreeable and even analogous to that of tea. When, on the contrary, the coca has been dried less perfectly, this agreeable aroma is hardly perceptible, or rather is overpowered by a pungent odour, *sui generis*, recalling the abominable smell exhaled by the breath of the masticators of coca, which is, in fact, this odour in a concentrated state. This *bouquet*, if I may so term it, is very perceptible on tasting the coca, and serves, according to its abundance, in indicating its quality. On the other hand, in a concentrated infusion, and still more so in a decoction, it is a bitterness mixed with something styptic that more particularly strikes the palate.

As to the immediate physiological effects of this infusion, frequently repeated trials enable me to assert that they are in general limited to a slight excitement, succeeded in most cases by some degree of sleeplessness.

The questions relative to the effects resulting from the use of coca are less easily determined ; we may begin, nevertheless, by stating that an immense majority of authors, both ancient and modern, who have written on the subject, have agreed in attributing to the coca-leaf thus employed, virtues whose well-ascertained existence would warrant it being placed among the more beneficial products of the vegetable kingdom ;† and such would doubtless remain the admitted opinion, had not a modern traveller completely shaken it, by supporting an opposite view, that is to say, in attributing to coca very pernicious effects, comparable in fact to those brought about by the excessive use of opium.

Such assertions in the presence of reports so opposite as those I have cited, may well cause some astonishment. Individuals are, however, not wanting, who give us to understand, that if this traveller had not trusted too implicitly to the accounts of ill-informed persons, he had erred at least, in too much generalizing exceptional facts. For my part, I may say, that the researches that I have been able to make on the subject, in localities where the coca is the most in use, have shown me that the mastication of the leaf does sometimes produce evil consequences among Europeans who have not accustomed themselves to it from youth ; and, in two or three cases, I have thought I could attribute to the abuse of this practice a peculiar aberration of the intellectual faculties indicated by hallucinations. But in the countries which I have visited, on no occasion have I seen the results to reach the point instanced by M. Poeppig.

Let us now examine what are the beneficial properties attributable to coca. Of these the most remarkable is undeniably its reputed power of sustaining the strength in the absence of any other nutriment. The facts on which this opinion rests have been asserted by so many credible persons, that scepticism must be carried very far to throw over it a doubt ; it appears to me, however, that opinions may vary according to the interpretation of the same facts.

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* Thus, Dr. Unanue speaking of the beneficial properties of the coca, says : "De la combinacion del alkali de la llipta con el acido de la Coca no resultara una sal neutra, una sal vegetal aperitiva y laxante que coopere en gran parte quando la Coca obra de este modo." Vide *Dissertacion sobre las virtudes de la famosa planta del Peru nombrada Coca.* Lima, 1794.

† "Quotquot Peruanam historiam scripserunt, referunt earum regionum incolas admodum delectari quarumdam radicum, ramusculorum, aut herbarum gestatione in ore, ut Orientales suo Betre [*betel*] delectantur : præsertim verò familiarem esse (Petri Ciecæ testimonio) quandam herbam *Coca* illis dictam, quam à summo mane ad noctem usque perpetuò in ore retinent, tametsi neque eam mandant, neque deglutiant. Percontati cur eam assiduè in ore habeant, respondent ejus usu nec famem nec sitim sibi molestam, et vires roburque sibi confirmari."—*Clusii Exoticorum Libri—Aromatum Historiæ, lib.* 1, *cap.* xviii.

One of two things is certain, either the coca contains some nutritive principle which directly sustains the strength, or it does not contain it, and therefore simply *deceives* hunger while acting on the system as an excitement.

As to the existence of a nutritive principle in coca, I am far from wishing to deny it; analysis, indeed, shows the existence in the leaf, and especially in its active principle,* of a notable quantity of nitrogen together with assimilable carbonized products; but the proportion of these substances is so small compared with the total mass of the leaf, and especially with the quantity of it that the Indian consumes in a given time, that they can hardly be taken into consideration. Moreover, I can affirm very positively that coca, as it is taken habitually, does *not* satiate hunger. This is a fact of which I have convinced myself by daily experience. The Indians who accompanied me on my journey chewed coca during the whole day; but evening arrived, they filled their stomachs like fasting men, and I am certain I have seen one devour as much food at a single meal as I should have consumed during two days. The Indian of the Cordillera is like the vulture of his mountains; when provisions abound he gorges himself greedily; when they are scarce, his robust nature enables him to content himself with very little. The use of coca assists, it may be, to support the abstinence; but we must have cases far more conclusive than those which I have witnessed, to convince me that it plays a part more important than that which I attribute to it. I will, however, add to what I have before said of the *llipta*, that this alkaline substance may also contribute by its direct influence on the secretions of the stomach, to allay the requirements of that organ.

The action of coca is then, in my opinion, confined to an excitement, but an excitement of a peculiar kind, which I consider as very different from that resulting from the use of most of the ordinary excitants, and especially of alcohol. Brandy gives strength, as all know; but who does not know also that the "gift" is but a *loan* made out at the expense of strength reserved for the future? The action of this agent, though powerful, is transient. The stimulus produced by mastication of the leaf of the *Erythroxylon* is, on the contrary, slow and sustained, characters which it owes doubtless in great part to the manner of its employment, since an infusion of coca acts very differently from the leaf taken in the ordinary way. It will be said that tea and coffee, whose effects appear to have more analogy with those of coca, would perhaps produce analogous results if taken in the same manner. I do not believe such would be the case. Tea and coffee (coffee in particular) act specially on the brain, on which they produce an antisoporific effect, but too well known to those who are not in their habitual use. But coca, while producing a little of this effect, when taken in large doses, as I have often experienced in my own person, does not act perceptibly upon the brain in small doses. To account for the ordinary effects of the leaf, one must then suppose that its action, instead of being localized, as in the case of tea and coffee, is diffused, and bears upon the nervous system generally, producing upon it a sustained stimulus, well suited to impart to those who are under its influence that support which has been erroneously attributed to peculiar nutritive properties.

Finally, I think that in the fidelity of the Indian to the use of coca, as with some smokers and their pipes, much is due to habit; and it is, I think, essential not to lose sight of the fact, that the force of habit must have an influence all the more powerful, since the habit in question is almost the only one he retains of past times, and that now, as then, he attaches to the use of the coca-leaf superstitious ideas, which, to his imagination, must at least treble the greatness of the benefits he derives from it. Lastly, that in the mastication of coca he finds the sole distraction that breaks the incomparable monotony of his existence.

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* From the sleeplessness induced by an infusion of coca, I at first thought it might contain theine, but the examination which I have made in following the processes recommended by M. Péligot, have negatived this supposition, and the same result has followed the more exact analyses which Professor Frémy has kindly made at my request. There nevertheless exists in coca a peculiar active principle, soluble in alcohol, insoluble in ether, very bitter, but which it has not hitherto been possible to obtain in crystals.

OZONE.

BY C. F. SCHÖNBEIN.

In Poggendorff's *Annalen* for 1847* I published a treatise, in which I endeavoured to prove that oxygen may exist in two different chemical states: in the ordinary state and in a state of increased chemical activity.

Since that time a number of new facts relating to this subject have been collected; the opinion which was then merely probable, appears now to have become a positive certainty, and several views have meanwhile been modified, so that a connected statement of the facts bearing essentially upon this difference in the chemical condition of oxygen may be of some service at the present time.

While occupied with electro-chemical experiments, I observed, during the electrolysis of water, a peculiar odour in the vicinity of the decomposition cell from which the gaseous elements escaped into the air. This odour was perfectly analogous to that perceived in so striking a manner during electrical discharges from points into the atmosphere and those of powerful batteries.

The repeated observation of this remarkable phenomenon, together with the total absence of any knowledge of the cause of the odour accompanying electrical discharges, induced me to devote my whole attention to this subject, and to endeavour to ascertain its physical history.

In this undertaking I was essentially aided by Mr. Grove, whose acquaintance I made in 1839, at the British Association at Birmingham, where he described a galvanic arrangement of astonishing power.

By means of this apparatus I was enabled to effect the electrolysis of water upon a much larger scale than formerly, and thus to carry out the investigations of the odour phenomena to the extent I had long wished.

The first results obtained by means of this apparatus were made known in a paper published in the Memoirs of the Munich Academy for 1840, in which I endeavoured to show that the electrical odour belongs to a gaseous substance which is evolved together with ordinary oxygen at the positive electrode in the electrolysis of water, and likewise makes its appearance during electrical discharges in the atmosphere.

Some years afterwards I succeeded in obtaining from atmospheric air the same odorous substance by chemical agency, independent of electricity, and by means of phosphorus, in such quantity as to be able to institute experiments as to the physical, chemical, and physiological action of this problematical substance upon a more extended scale than was hitherto possible, and since that period the investigation of this intricate subject has absorbed the greater part of my leisure time.

I may therefore say that I have been almost incessantly engaged with this subject for full fourteen years, and may likewise add that it was only from a conviction that a fundamental fact was involved in the phenomenon that I was enabled to exercise the perseverance and patience requisite for so protracted and little regarded an investigation.

At various times I made known the results of my labours as well as conjectures respecting the cause of this remarkable phenomenon, although without ever venturing to express a decided opinion as to the nature of the substance in question, for no one was more sensible than myself that there was no adequate basis for speculation. That, in the first instance, I entertained erroneous views, I have no hesitation in confessing.

As a conclusion of these historical remarks, I may observe that the assumption that this substance was analogous to chlorine, led to the discovery of a by no means inconsiderable number of facts.

Methods of Ozonizing ordinary Oxygen.—Ozonized oxygen differs from ordinary oxygen in possessing a peculiar odour, and besides a peculiar oxidizing action, subsequently treated of, in liberating iodine from iodide of potassium at the ordinary temperature, consequently a mixture of this salt with starch paste is immediately rendered blue by ozone, while this is not the case with ordinary oxygen. I have therefore long used as a reagent for this substance paper saturated with iodide of potassium and starch.

Ozonization may be effected by electrical, voltaic, and chemical means.

1. When a succession of electrical discharges are passed through a small volume

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* Vol. lxxi., p. 517.

of pure and perfectly dry oxygen it acquires a peculiar odour, and the capability of liberating iodine from iodide of potassium.

The most convenient form of apparatus for this purpose is a well-stoppered bottle about an inch wide, several inches long, and furnished with two platinum wires passing into it through opposite parts, so far that the ends are about 4 or 5‴ apart. One of the wires is connected with the prime conductor of a powerful electrical machine, and the other wire with the earth, and the discharge maintained until the peculiar odour appears, and a strip of moistened iodide and starch paper, dipped into the bottle, becomes sensibly blue.

De la Rive and Marignac used a glass tube connected at one side with the oxygen generator, and at the other with a small flask, in which the characters acquired by the gas, under the influence of the electrical discharge, might be observed.

Berzelius, Marchand, and Erdmann instituted similar experiments with dry chemically pure oxygen, and obtained the same results.

Becquerel and Frémy employed with advantage a powerful induction apparatus after Rhumkorf's model. Baumert used a similar apparatus, and experimented with oxygen obtained by the electrolysis of water, and carefully deprived of water and ozonized oxygen.

The results obtained by all these experimenters and by myself do not, I think, leave any doubt that oxygen in the purest obtainable state, and however prepared, may be ozonized by electrical discharge.

It is, however, worthy of remark, that however small a quantity of ordinary oxygen is submitted to the influence of the discharge, and however long this may be maintained, the gas is never perfectly ozonized. A portion of the oxygen always remains in the ordinary state.

Becquerel and Frémy state that during the first hour the quantity of ozonized oxygen increases in proportion to the time that the influence is maintained, but it afterwards diminishes in quantity when the action is continued; so that it would appear the electrical discharge produces simultaneously two opposite results—ozonization and deozonization.

When, however, the experiment is conducted in such a manner that as the ozonized oxygen is produced it is separated from the unaltered oxygen, by means of an oxidizable substance, such as moist silver—which under these circumstances is converted into peroxide—any given volume of oxygen may be wholly ozonized by maintaining the electrical discharge for a sufficiently long time. For this purpose Becquerel and Frémy introduced solution of iodide of potassium or moist silver into small tubes filled with oxygen, and by continuing the discharge for a number of hours, succeeded in ozonizing the whole of the gas until the last trace was absorbed.

Another fact which deserves notice was ascertained by these experimenters, and previously by myself in a different manner.

When electrical sparks are allowed to pass over the surface of a tube sealed at both ends, and containing ordinary oxygen, with a strip of moist iodide and starch paper, the blue colour is soon developed. As this effect is not produced under the same circumstances in tubes containing hydrogen free from oxygen, it is evident that the blue colour produced in this experiment is owing to the ozonization of the oxygen, and not to the electrolysis of the iodide of potassium, and that this ozonization is effected by induction. I shall subsequently show that the ozonization of oxygen by induction sometimes takes place on a large scale naturally.

Oxygen mixed with nitrogen, and that contained in atmospheric air, may be ozonised by electricity as well as pure oxygen, and this may be effected most simply by an electrical discharge from a metal point into the air.

It has long been known that under these circumstances a peculiar odour—the so-called electrical odour—is developed, and my experiments have shown that atmospheric air submitted to the influence of an electrical discharge produces all the effects observed with pure oxygen ozonized by electrical sparks. When, for instance, a strip of moist iodide and starch paper is held before a somewhat blunt metal point connected with the prime conductor of a powerful machine, it becomes blue immediately upon the commencement of the discharge, and this reaction is evidently due to the production of ozonized oxygen, not, as was at one time erroneously supposed to the formation of nitric acid, for, according to my observations, hydrated oxide of lead, ferrocyanide of potassium, and sulphate of manganese, are respectively converted by the electrical brush discharge into binoxide of lead, ferricyanide of

potassium, and binoxide of manganese, changes which nitric acid is incapable of effecting.

The effects produced by the electrical brush discharge takes place during every equalization of electrical conditions in the atmosphere—the discharge of a Leyden jar, friction of an insulated glass plate, &c., as may be perceived by the peculiar odour accompanying these conditions, and belonging to ozonized oxygen.

The odour developed by flashes of lightning has been repeatedly observed, and I have myself witnessed many instances of it. From what is now known of the conditions under which the ozonization of oxygen takes place, we may with safety assume that the odour in this case is owing to nothing else than ozonized atmospheric oxygen, for as the smallest electrical spark which passes through the air ozonizes a portion of the oxygen, the same effect must be produced by lightning, which is nothing more than a gigantic electrical spark.

In whatever manner, therefore, an electrical discharge may take place in ordinary oxygen or in atmospheric air, a certain quantity of oxygen is always ozonized, and, as in our atmosphere, electrical discharges are continually taking place, independently even of thunder-storms, ozonization must likewise be constantly going on, and the air will always contain more or less ozonized oxygen, although the proportion is always minute.

The presence of ozonized oxygen in atmospheric air may be easily detected by the test-paper already spoken of, and which becomes blue when exposed for a greater or less time, while this effect is not produced by enclosed air.

With regard to the presence of ozonized oxygen in atmospheric air, the following remarks may not be out of place. Some years since, I made observations by means of an apparatus constructed for the purpose, and which I call an ozonometer,* of the alteration in the proportion of ozonized oxygen in the atmosphere, and find that on the average it is greatest in winter, particularly during a fall of snow, smallest in summer, and in the other seasons very variable. In the neighbourhood of thunder-clouds, the proportion of ozonized oxygen is very considerable, as I have frequently observed upon elevated points of the Jura; sometimes the test-paper becomes blue in a few minutes. I have likewise ascertained by numerous observations, that the proportion of ozonized oxygen increases with the elevation above the sea level.

By comparing the observations of Quetelet with the indications of my ozonometer, I find a correspondence of such a kind that the mean maximum and minimum of atmospheric electricity fall in the same seasons as the mean maximum and minimum proportion of ozonized oxygen, both maxima being in winter and both minima in summer. A similar correspondence exists for the other seasons, and it is likewise known that the atmospheric electricity increases with the elevation.

Considering the connexion existing between the ozonization of oxygen and electricity, the correspondence between the indications of the atmospheric electrometer and those of the ozonometer is not surprising, for the latter is obviously an indirect electrometer.

The facts that notwithstanding the incessant ozonization of atmospheric oxygen, the quantity present in the air does not increase, and that the proportion is less in the lower than the higher regions of the atmosphere, result perhaps chiefly from the circumstance that it is absorbed in the oxidation of organic remains at the earth's surface, and of gases evolved in processes of decay, &c.

At places where such gaseous substances are generated in considerable quantity, as in narrow, thickly populated streets, &c., the test-paper never becomes blue.

I may likewise add that the stinking exhalations which are produced in the putrefaction of flesh, &c., are destroyed by ozonized air as by chlorine, and I am therefore inclined to believe that the ozonized atmospheric oxygen is of essential service in removing by oxidation the substances of this kind which are constantly introduced into the atmosphere.

It is a remarkable circumstance that ozonized oxygen is produced not only at the spot where the lightning-flash passes, but likewise within a greater or less distance round. At Basle I have had repeated opportunities of observing that the odour of ozonized oxygen appears in closed rooms some hundred yards from the seat of the flash, and upon one occasion I observed this in my own house. This fact, though on a larger scale, is indeed perfectly identical with the ozonization of oxygen in sealed tubes by induction in Becquerel's experiments.

* The ozonometer is made by Burghy, a bookbinder in Basle, for about three shillings.

Previous to the discharge of a thunder-cloud, the air situated between it and the earth is (by induction) in a state of electrical tension to an extent dependent upon the size of the cloud, its elevation, and the amount of its charge. At the moment of discharge, the electrical tension of the mass of air ceases, and ozonized oxygen is produced wherever this equalization of opposite electrical states takes place. It is on this account that the odour appears with more or less intensity at places more or less distant from the flash, even in closed rooms, where the effect is produced by induction in the same manner as through glass tubes.

In consequence of the presence of nitrogen and water in the atmosphere, a portion of the ozonized oxygen produced is consumed in the production of nitric acid, which accounts for the acid taste perceived when an electrical spark passes through air near the tongue, as well as for the production of nitric acid in Cavendish's experiment, and the existence of traces of nitric acid in the atmosphere, in the rain accompanying thunder-storms, &c.

Lastly, I must mention that the ozonization of oxygen by means of electrical discharges does not take place at elevated temperatures, as may easily be observed when oxygen gas is passed through a narrow tube heated by a spirit-lamp, and in which sparks are produced by an induction apparatus. A moist strip of the test-paper held before the tube where the gas issues is not at all coloured, nor is the slightest odour perceptible so long as the tube is kept sufficiently hot.

This influence of temperature upon the ozonization of oxygen seems to me to be closely connected with the fact ascertained by me some years since, that an electrical discharge from heated metal points into the air does not produce the least odour nor any blue colour in the test-paper, although these effects appear as soon as the metal points have become cool.

2. When the current from a powerful voltaic battery is passed through a mixture of about one part chemically pure sulphuric acid and twelve parts of water at as low a temperature as possible, the oxygen gas evolved at the positive electrode has a very marked odour, and produces immediately a deep blue coloration of the test-paper—in short, all the effects of ozonized oxygen. But when the acidulated water contains mere traces of an oxidizable substance, sulphurous acid, nitrous acid, protoxide of iron, organic substances, &c., the oxygen evolved is inodorous, and does not produce any blue colour in the test-paper, or any of the phenomena of oxidation peculiar to ozonized oxygen.

According to Dr. Baumert, the quantity of ozonized oxygen obtained from a solution of chromic and sulphuric acids, is so much greater than that from the above-mentioned mixture, that vulcanized caoutchouc tubes are perforated by the gas within a few minutes. But in all cases the quantity of ozonized oxygen is always very small in proportion to that of ordinary oxygen evolved at the same time from the positive electrode in the electrolysis of water.

This Chemist has inferred from his experiments, that the odorous substance which produces the blue colour of the test-paper is not pure ozonized oxygen, such as is produced from dry oxygen by the electrical discharge, but a compound of two equivalents of ozonized oxygen with one equivalent of water, *i. e.* $H O_3$, or a hydrate of ozonized oxygen.

For the evidence which he brings forward in support of this view, I must refer to his memoir,* and as I purpose on another occasion to consider his researches upon the subject, I will merely state the method by which he endeavoured to prove the presence of hydrogen in the odorous substance evolved at the positive electrode in the electrolysis of water. He coated the inner surface of a long narrow glass tube with a film of anhydrous phosphoric acid, and then passed through this tube the odorous oxygen gas obtained by the electrolysis of water, and previously well dried. Under these conditions the film of anhydrous phosphoric acid remains perceptible, however long the current of gas is maintained. But when the centre of this tube is heated by means of a spirit-lamp, the film of phosphoric acid disappears beyond the flame in the direction of the current of gas, while at the other side of the flame it remains unaltered.

This difference in the behaviour of the film of phosphoric acid at different parts of the tube, is ascribed by Baumert to the formation or separation of water from HO_3

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* *Annalen der Physik und Chemie*, lxxxix. 38, and *Annalen der Chemie und Pharmacie*, lxxxviii. 221.

at the heated part. He likewise considers it probable that pure ozonized oxygen in contact with water combines with it forming HO_3, and that it is this gaseous peroxide of hydrogen to which belongs the peculiar odour.

Since, however, the dry oxygen ozonized by electrical sparks has a penetrating odour, it must, if Baumert's view is correct, combine with water with great avidity, and even during the act of smelling, so that in fact we cannot determine whether pure ozonized oxygen has any smell or not.

The case may be as Baumert supposes, but it may also be otherwise, that the assumed hydrate is odorous only because the pure ozonized oxygen itself is odorous, as is the case with chlorine and its hydrate.

It is likewise possible, although in my opinion improbable, that perfectly dry chlorine has no odour, and becomes odorous only by hydration.

3. Ordinary phosphorus* in contact with water and oxygen, under the ordinary atmospheric pressure and temperature, does not effect the slightest ozonization of the gas; at 75° F., however, the ozonization commences, and at 97° F. goes on rapidly.

In gas under one-fourth or one-fifth the ordinary pressure, the ozonization takes place at the ordinary temperature. The presence of water facilitates the ozonization, because it continually removes from the surface of the phosphorus the phosphorus acid which is produced by a portion of the ozonized oxygen, and maintains contact between the phosphorus and the oxygen, which is an essential condition of ozonization.

According to Marchand's experiments, however, phosphorus is capable of ozonizing perfectly anhydrous oxygen, at the ordinary temperature and pressure, when passed in a stream over the phosphorus. But in consequence of the formation of a coating of phosphorus acid, the ozonization soon ceases until the surface is renewed.

When phosphorus with a clean surface is introduced into a mixture of one volume oxygen gas and several volumes of hydrogen, while about one-third of the phosphorus is covered with water, ozonization takes place even at the ordinary temperature, with such intensity that the experiment is attended with danger, inasmuch as the ozonized oxygen produced under these conditions in great abundance immediately exercises a powerful oxidizing action upon the phosphorus, in consequence of which it melts, ignites, and causes the mixture of gases to explode.

Nitrogen gas has in a less intense degree the same influence as hydrogen, and it is for this reason that atmospheric air is the best mixture for the ozonization of oxygen. For this purpose a stick of phosphorus about two inches long, and with a clean surface, is introduced into a flask of about 130 litres capacity, filled with atmospheric air, and containing enough water to cover about half of the phosphorus. The mouth of the vessel is then loosely closed by a stopper or cork, and the whole exposed to a temperature from 61° to 70° F. Under these conditions a thin column of vapour soon begins to rise from the phosphorus, indicating the commencement of the ozonization. Even after a few minutes the flask contains so much ozonized oxygen, that it may be perceived by the smell, and produces a distinct blue colour on the test-paper. After some hours, the air is so charged with ozonized oxygen, that a moist strip of the test-paper is immediately rendered dark blue.

Under conditions otherwise similar, the ozonization of oxygen takes place more rapidly the quicker the phosphorus vaporizes, and in this respect there is a limit below which ozonization does not take place, consequently all the physical conditions which facilitate or retard the vaporization of phosphorus, extend a similar influence to the ozonization of oxygen. It is on this account that elevation of temperature, reduction of pressure, motion of the gas, and dilution with hydrogen or oxygen, determine or facilitate ozonization, and it is probable that the ozonizing influence is exerted by the phosphorus vapour rather than by the solid substance.

There can be no doubt that the well-known fact of the ignition of phosphorus at the ordinary temperature when the air is suddenly exhausted from the containing vessel, is connected with ozonization of the oxygen, and that in a reverse sense this is the case as regards the absence of luminosity of phosphorus in contact with compressed atmospheric air, or of any oxidation of the phosphorus. Ozonization does not take place in compressed atmospheric air at the ordinary temperature. It cannot but be evident that these facts are striking illustrations of the influence of physical conditions upon chemical phenomena.

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* Amorphous phosphorus does not, under any circumstances, produce ozonization.

The presence of only minute quantities of certain compound oxidizable gases or vapours in atmospheric air or mixed with oxygen gas, wholly prevents the ozonization by means of phosphorus, and likewise the luminosity and oxidation of that substance. Olefiant gas is in this respect particularly active; $\frac{1}{400}$ of this gas mixed with atmospheric air is sufficient to prevent the ozonization at the ordinary temperature. The vapour of ether, alcohol, of many volatile oils, sulphurous acid, nitrous acid, &c., have a similar influence. As a general rule, all the gases and vapours which absorb ozonized oxygen with avidity likewise prevent or retard ozonization.

Now that we know the luminosity of phosphorus is so intimately connected with ozonization, inasmuch as phosphorus combines only with ozonized oxygen at the ordinary temperature, it is also intelligible why all the gases and vapours which hinder the luminosity of phosphorus in atmospheric air are precisely those which prevent the ozonization of oxygen. But in what manner the influence of these gases and vapours is exercised, or to what circumstances it is to be attributed, I do not yet venture to explain.

As stagnant oxygen, under the ordinary pressure and temperature, does not oxidize even moist phosphorus, while on the other hand ozonized oxygen most readily enters into combination with that substance even in the cold, and the so-called slow combustion of phosphorus never takes place in oxygen or atmospheric air without the simultaneous appearance of ozonized oxygen, and most conditions which prevent ozonization likewise hinder the oxidation of phosphorus, and those which facilitate ozonization also facilitate oxidation, I have from these facts long been of the opinion, that the slow combustion which phosphorus suffers at the ordinary temperature in rarefied oxygen, or in atmospheric air, is effected not by ordinary but by ozonized oxygen. If this inference is admissible, it may be likewise assumed, that the first action which phosphorus exercises upon ordinary oxygen is ozonization, and that this allotropic change always precedes the slow combustion, a circumstance which to me appears of considerable theoretical importance.

If the view entertained by Baumert is correct, we might regard the oxidizing gaseous substance which is produced by the action of phosphorus upon moist oxygen or atmospheric air not as pure ozonized oxygen, but as the peroxide referred to.

When 300 litres of atmospheric air, ozonized to the greatest degree by means of phosphorus, and carefully dried by sulphuric acid, was passed through a heated glass tube, and thence through a weighed tube filled with pummice-stone, saturated with sulphuric acid, I did not find any increase in the weight of the latter, although the air which had been treated in this manner had no longer the least odour, and did not react on the test paper; and from this experiment I am inclined to consider, that the gas ozonized by phosphorus does not contain any hydrogen.

(*To be continued.*)

MANUFACTURE OF CARBONATE OF MAGNESIA.

Native Carbonate of Magnesia.—Native carbonate of magnesia, or magnesite, has been found at Hrubschitz, district of Gromau, in Moravia; at Baudissero and Castellamonte, villages in the vicinity of Turin, Piedmont; in the East Indies; and in the district of Kironile, in the Eubæa. Specimens of the Piedmontese magnesite were exhibited under the name of Giobertite, in the Sardinian section of the Exhibition of 1851. It takes its name of Giobertite from Giobert, who established its true nature, it having passed for a long time for pure alumina. The magnesite from Baudissero contains 68 per cent. of magnesia, and that of Castellamonte 26.3 per cent. The native carbonate from Moravia contains about 46 per cent. of magnesia. The analysis by Dr. Henry of a sample of native carbonate from a cargo imported by Mr. Babington from India, also gave 46 per cent. of magnesia. It constitutes a range of low hills in Hindostan. In the Eubæa there are entire hills of it. The mines or quarries are situated in the villages of Limni, Kotsikia, and Matondi; the produce of the last named village is the best in quality. It is stated that upwards of 2000 tons are annually exported to Smyrna and England. The Eubæan magnesite contains 44 per cent. of magnesia. It is used for the manufacture of pure magnesia, and, as mentioned in our last number, Epsom salt. It is a very useful ingredient in the composition of bricks for refractory furnaces, on account of its property of resisting the heat of fire. Specimens of native carbonate of magnesia

from Madras, and of Epsom salt manufactured therefrom, were shown in the Exhibition of 1851; also specimens of magnesite from Eubæa.

In England carbonate of magnesia is found in combination with carbonate of lime forming what is called magnesian limestone or dolomite. The magnesian limestone extends from Newcastle to Nottingham. Annexed are the analyses of five specimens:—

	1.	2.	3.	4.	5.
Carb. Lime.....	57.50	55.70	54.19	51.10	54.05
" Magnesia.....	39.40	41.60	41.37	40.20	38.58
Silica	0.80	—	2.53	3.60	1.80
Oxide of Iron.....	0.70	0.40	0.30	1.80	1.36
" " Manganese	—	—	—	trace	1.50
Water and loss.....	1.60	2.30	1.61	3.30	2.71
	100.00	100.00	100.00	100.00	100.00

The preparation of carbonate of magnesia, the *Magnesia Alba* of P. L. 1787, was for several years a considerable secret in the possession of some particular persons. It formerly bore the name at Rome of Count Palma's powder. Many, however, are of opinion that the mode of preparation was carried from Germany to Italy. Lancisi, in 1717 (and it is said, Valentini, in 1707), and afterwards Hofmann, in 1722, made public the process of manufacture. At that time it was extracted from the mother-liquor which remains after the crystallization of rough nitre (chloride of magnesium) by precipitation with a solution of carbonate of potash or soda. The name *Miraculum Chemicum* was given to it from the circumstance of a precipitate being formed by the admixture of two pellucid solutions.

Manufacture of Carbonate of Magnesia from Epsom Salt.—The manufacture of carbonate of magnesia from sulphate of magnesia, was first made known by Henry, of Manchester. The process communicated by him was as follows:—"Dissolve any quantity of sal catharticus amarus in its own weight of water; filter and add to it by degrees a filtered solution of pearl or potashes, in an equal quantity of water, stirring them gently, until the mixed liquids have acquired the appearance of a complete coagulum. Then desist from adding any more of the alkaline lixivium, and immediately throw the mixture into a large vessel of boiling water; keep it boiling a quarter of an hour, then take it out and put it into glazed earthen vessels. As soon as the powder hath subsided, and before the water is quite cold, pour it off, and add a fresh quantity of boiling water; repeat these ablutions with hot water several times until the liquor has entirely lost its saline taste; then let it be so agitated as to suspend the finer parts of the powder, in which state decant it into other vessels, and having separated the water from the magnesia, by inclination, put it on large chalk-stones, until a considerable part of the humidity is absorbed. Then wrap it up in sheets of white paper, and dry it before the fire. Pour hot water upon the remaining powder, stir and decant it in its turbid state, and separate the magnesia from the water as before; thus the whole, or most of it, will be reduced to an equal degree of fineness. The larger the quantity of water into which the precipitated powder is cast, the more speedily and perfectly will the vitriolated tartar, which is formed by the union of the alkali with the acid of the sal catharticus, be washed off. The neutral salt should be washed off as quickly as possible, otherwise, by allowing the mixture to stand for some time, the powder concretes with minute grains, which, when viewed with a microscope, appear to be assemblages of needles diverging from a point. These concretions cannot be redissolved by any washing, however long continued. Dr. Black orders four times the quantity of water to that of the solution for throwing the coagulum into; but Mr. Henry observes, that this quantity is much too little. The water should be pure, and distilled water is the best. Hard or impure water makes magnesia coarse and disagreeable."

In the Pharmacopœias of the London and Edinburgh Colleges carbonate of soda is directed to be employed in the manufacture of carbonate of magnesia from sulphate of magnesia. The two *boiling hot* solutions are run together into large wooden vessels, while a workman keeps the whole in continued agitation for some time. The mixture is afterwards allowed to remain at rest for an hour or so to permit the precipitated carbonate of magnesia to subside. When this deposit has taken place the fine precipitate is repeatedly washed with pure water to remove all traces of the sulphate of soda formed by the double decomposition of the two salts

The carbonate of magnesia is then allowed to drain until it acquires sufficient consistency to be formed into small pieces of the shape of parallelopipedons, and then dried on wooden shelves in a stove at a low temperature.

On account of the great tendency of carbonic acid to form soluble bi-salts, it is necessary that the solutions of sulphate of magnesia and carbonate of soda should be mixed *boiling* in the manufacture of carbonate of magnesia. The magnesia alba, or carbonate of magnesia of commerce, is a *subcarbonate*, consisting of a combination of neutral carbonate of magnesia and hydrate of magnesia. The neutral carbonate is a crystallizable salt, which may be frequently observed depositing in the bottles containing solutions of the bicarbonate in Murray's fluid magnesia. This neutral carbonate is decomposed when put into water. If the water be cold it is decomposed into magnesia alba and bicarbonate; if the water be boiling it is resolved wholly into magnesia alba or the subcarbonate, the excess of carbonic acid being expelled.

Heavy Carbonate of Magnesia.—Pereira gives the following as the method which he has seen followed in a large and esteemed manufactory :—Add one volume of a cold saturated solution of carbonate of soda to a boiling mixture of one volume of a saturated solution of sulphate of magnesia and three volumes of water. Boil until effervescence has ceased, constantly stirring with a spatula. Then dilute with boiling water, set aside, pour off the supernatant liquor, and wash the precipitate with hot water on a linen cloth. Afterwards dry it by heat in an iron pot.

Manufacture of Carbonate of Magnesia from Bittern.—In the manufacture of carbonate of magnesia from bittern (chloride of magnesium), or the mother-liquor remaining after the extraction of common salt from sea-water, the crude carbonate of ammonia, obtained in the distillation of bones or the ammoniacal liquor of gas-works, is used as the decomposing agent. In this case carbonate of magnesia is precipitated and muriate of ammonia obtained in solution. The after treatment is the same as that described above. Dolomite is also employed for the decomposition of bittern in the same way as that of artificial chloride of magnesium. In this process the carbonate of lime of the dolomite becomes converted into chloride of calcium, leaving the carbonate of magnesia behind as an insoluble powder.

Manufacture of Carbonate of Magnesia from Dolomite.—In his patent of January 23rd, 1852, Dr. Richardson claims the manufacturing of magnesia and carbonate of magnesia from magnesian limestone by the employment of muriatic acid. The quantity of acid used should be slightly in excess of the exact quantity required to dissolve out the lime in the limestone operated upon. This may be either burnt to expel the carbonic acid, and then slaked in pits previous to adding the muriatic acid, or it may be employed in the natural state, reduced to an impalpable powder, the product in the former case being magnesia, and in the latter an impure carbonate, which may either be employed as such, or be deprived of its carbonic acid by the application of heat. The acid preferred for this purpose is the weak muriatic acid, which is at present allowed to run to waste in alkali works, and the proportion of it used is a quantity containing about thirty-seven parts of pure hydrochloric acid to every twenty-eight parts of lime in the calcined magnesian limestone, and the same for every fifty parts of carbonate of lime in the uncalcined stone.

The magnesia or carbonate of magnesia thus obtained, Dr. Richardson employs in the manufacture of magnesian salts, as noticed in the article on "Epsom Salt" in the last number of the Pharmaceutical Journal. He also manufactures carbonate of magnesia by causing a stream of carbonic acid to be forced through vessels containing magnesia obtained as before mentioned, diffused through water. A bicarbonate is thus produced, which enters into solution with the water, and this is subsequently converted into carbonate, which is obtained as a precipitate by the application of a gentle heat to the vessel containing the solution of bicarbonate.

The best process for the manufacture of carbonate of magnesia is undoubtedly that patented by Mr. H. L. Pattinson, Sept. 24th, 1841. The process is as follows: Magnesian limestone, as rich as possible in magnesia, is reduced to powder, and sifted through a sieve of forty or fifty meshes to the linear inch. It is then heated red-hot in an iron retort or reverberatory furnace for two or three hours, when, the carbonic acid being expelled from the carbonate of magnesia and not from the carbonate of lime, the whole is withdrawn from the retort or furnace, and allowed to cool. The magnesia contained in the limestone is now soluble in water impregnated with carbonic acid gas, and to effect this solution, Mr. Pattinson proceeds as follows :—An

iron cylinder lined with lead, of any convenient size, say four feet long by two feet and a half in diameter, is provided, furnished with a safety-valve and agitator, which latter may be an axis in the centre of the cylinder, with arms reaching nearly to the circumference—all made of iron and covered with lead. This cylinder is placed horizontally, and one extremity of this axis is supported within it by a proper carriage, the other extremity being prolonged, and passing through a stuffing-box at the other end of the cylinder, so that the agitator may be turned round by applying manual or other power to its projecting end. A pipe leading from a force-pump is connected with the under side of the cylinder, through which carbonic acid gas may be forced from a gasometer in communication with the pump, and a mercurial guage is attached to show at all times the amount of pressure within the cylinder, independently of the safety-valve. Into this cylinder so fitted up as described, from 100 to 120 lbs. of the calcined limestone is introduced, with a quantity of pure water nearly filling the cylinder ; carbonic acid gas is next pumped in, the agitator being constantly turned the while, and more and more gas forced in, until absorption ceases under a pressure of five atmospheres. The whole is allowed to remain in this condition for three or four hours, and the contents of the cylinder are then run off into a cistern and allowed to settle. The clear liquor is now a solution of carbonate of magnesia in water, impregnated with carbonic acid gas, or a solution of bicarbonate of magnesia having a sp. grav. of about 1028, and containing about 1600 grains of carbonate of magnesia to the imperial gallon.

Mr. Pattinson considers the best mode of obtaining a solution of bicarbonate of magnesia from magnesian limestone, is to operate upon the limestone after being calcined at a red heat in the way described, but the process may be varied by using in the cylinder the mixed hydrates of lime and magnesia, obtained by completely burning magnesian limestone in a kiln, as commonly practised, and slaking it with water in the usual manner, or, to lessen the expenditure of carbonic acid gas, the mixed hydrates may be exposed to the air for a few weeks, until the lime has become less caustic by the absorption of carbonic acid from the atmosphere, or the mixed hydrates may be treated with water as practised by some manufacturers of Epsom salt, until the lime is wholly or principally removed, after which the residual rough hydrate of magnesia may be prepared for solution in the cylinder by dissolving magnesian limestone in hydrochloric acid, and treating the solution, or a solution of chloride of magnesium, obtained from sea-water by salt-makers in the form of bittern, with its equivalent quantity of hydrate of lime, or of the mixed hydrates of lime and magnesia obtained by completely burning magnesian limestone and slaking it as above. Mr. Pattinson states that, when he uses this solution of bicarbonate of magnesia for the purpose of preparing carbonate of magnesia, he evaporates the solution to dryness, by which he at once obtains a pure carbonate of magnesia, without the necessity of using a carbonated alkali as in the old process ; and from this he prepares pure calcined magnesia by calcination in the usual manner, or, instead of boiling the solution to dryness he merely heats it for some time to the boiling point, by which excess of carbonic acid is partly driven off and pure carbonate of magnesia precipitated, which is collected and dried in the usual way.

Manufacture of Carbonate of Magnesia from Magnesite.—Dr. Richardson's more recent improvements in the manufacture of carbonate of magnesia are contained in the specification of his patent, dated June 14th, 1853. He takes any impure hydrate, or carbonate of magnesia, free from lime, or nearly so, such for instance as *magnesite*, (the impure hydrate of magnesia, which is a waste product in Ward's process of carburating soda ash, being preferred) and diffuses it through water, so as to form a cream or milk-like fluid, which he runs into a large soda-water machine, wherein he pumps carbonic acid, in the same manner as when making soda-water. Or, he partially fills a wooden box, divided into cells by partitions running from the top and bottom alternately, with this milk-like fluid, and by means of a steam-jet, or air-pump worked by suitable machinery, he draws a stream of carbonic acid through the whole series of compartments from a furnace filled with coke or charcoal. When the liquid becomes saturated with bicarbonate of magnesia, or stands at 5° to 11° on Twaddell's hydrometer (sp. grav. 1.025 to 1.055), it is drawn off, and after standing about an hour a small quantity of a cream of magnesite is gradually added, which he finds carries down all the oxide of iron and other impurities, leaving a clear pure solution of bicarbonate of magnesia. This solution is heated to expel the excess of carbonic acid, when the carbonate precipitates, and is collected and

treated in the usual way, or a quantity of pure magnesia in suspension in water is added until the whole is precipitated as carbonate of magnesia.

The furnace employed for producing carbonic acid is filled with coke or charcoal, and is supplied with air through an opening at the bottom, and another higher up on a level with the top of the fuel. The air may be drawn through by means of a jet of steam or otherwise, or forced forwards by a blowing cylinder or fan-blast, so regulated by valves or dampers that the supply of air entering at the upper opening shall be a little more than sufficient to convert all the carbonic oxide into carbonic acid, so as to economize the fuel and render the action of the gas more energetic on the milk of magnesia. Carbonic acid obtained from any other source equally answers the purpose.

ON THE PREPARATION AND USE OF PERCHLORIDE OF IRON.

BY M. GOBLEY.

Perchloride of iron had been almost abandoned as a therapeutic agent, when M. Pravaz, a distinguished surgeon at Lyons, proposed a new mode of applying it in the treatment of aneurism and varicose veins, which consists in injecting into the arteries or veins a few drops of a concentrated solution of the salt. Under the influence of this liquid all the blood within a distance of three or four centimetres is converted in a few minutes into a solid clot. This new mode of treatment, however, is only now being tested.

It has not yet been determined what is the real mode of action of perchloride of iron on the blood. According to some, it coagulates the whole of the blood and all its elements. According to others, it acts only on the fibrine, and others again contend that its action is confined to the albumen.*

It still remains to be shown what is the nature of the clot, whether the perchloride is a simple hemostatic or a hemospasic, whether it acts as an irritant caustic or as a toxic agent, and, moreover, what is the maximum dose that can be safely applied.

It will be seen from these questions, which have been recently discussed in the Academy of Medicine, that some importance attaches to the preparation of perchloride of iron. M. Burin de Buisson, who made, with M. Pravaz, the first experiments with the new mode of treatment to which reference has been made, prepared in the following manner the chloride which they used. Peroxide of iron, previously heated to redness, was digested without heat for five or six hours with colourless and pure hydrochloric acid; the mixture was then heated over a water-bath, until about 200 parts of the oxide were dissolved in 1000 parts of acid. The process should be conducted with a porcelain capsule the weight of which is known. The liquid having been decanted from the undissolved oxide was carefully evaporated over a water-bath, stirring it continually until it acquired the consistence of a thick syrup, the weight of which was determined. This was mixed with half its weight of distilled water, heated for a short time, and then filtered. The capsule and filter were washed with a quantity of water equal to that previously used, and the whole subsequently brought to the density of 43.5° or 44°.

The chloride prepared in this way is subject to the objection of its retaining too much free hydrochloric acid. If, instead of stopping the evaporation at the point indicated by M. Burin du Buisson, it be continued for a longer time, it becomes still more acid. It is known also how difficult it is to keep for any length of time a solution of perchloride of iron without the deposition of insoluble oxychloride and the development at the same time of free acid in the solution.

In order to obviate these objections, M. Burin du Buisson proposed, in a new memoir addressed to the Academy of Sciences, to substitute the following process for that already described :—

Pure hydrochloric acid is to be saturated as far as possible with hydrated peroxide of iron; the solution is evaporated over a gentle fire to about one half, and then further evaporated over a water-bath, taking care to remove the aqueous vapours, as I had before indicated, as these cause the formation of hydrochloric acid and the

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* M. Burin du Buisson has ascertained that ten drops of solution of perchloride of iron, of 45°, added to the white of an egg diluted with thirty grammes of water, causes the whole to become, in fifteen seconds, a mass which, on inverting the vessel in which it is contained, remains adhering to the sides, and will not fall out for some time.

deposition of oxychloride of iron. When the liquid has thus acquired the consistence of a thick syrup (in this state it crystallizes on being cooled, without, however, assuming a solid mass), the evaporation is stopped, and an excess of gelatinous hydrated peroxide of iron mixed with a little water is added; they are stirred together for a quarter of an hour, and then allowed to stand for several hours. Sufficient distilled water is added to make the density equal to 30° Baumé, and it is then left in contact with excess of hydrated oxide for eight days when it is filtered, and again allowed to stand for fifteen days. The density of 20° Baumé is that which MM. Valette, Desgranges, and Petrequin prefer for the treatment of varicose veins. For aneurisms these surgeons think it is sufficient to employ a solution at 20° or even 15°.

This new mode of preparing the ferric solution has no material advantage over the former. The contact of the liquor with hydrated oxide of iron does not remove free hydrochloric acid so effectually as evaporation, as M. Burin du Buisson has himself admitted. It is known that solution of perchloride of iron, even when made from the sublimed chloride, has always an acid reaction.

If it be impossible to prepare solution of perchloride of iron without its being acid, and if it be important that it should be as little acid as possible, would it not be preferable to have recourse to the chloride of iron prepared by the process which I described in 1844?* The ferric solution would then be a preparation which the surgeon could prescribe of any strength he may desire. The dry chloride may be kept for a long time without change; it forms a clear solution with water; which also may be kept for some time without any sensible alteration. The chloride of iron prepared from hematite (according to M. Gobley's process referred to) is chemically more pure and more surely uniform than that made from the hydrated oxide. It also contains a smaller quantity of free acid. I believe, indeed, that it contains but a mere trace. If, in preparing it, the evaporation be continued beyond the point at which it becomes solid on cooling, I have observed that it decomposes into hydrochloric acid and oxychloride of iron. The solution which M. Burin du Buisson now prefers to use is but slightly acid when recently prepared, but it becomes more acid after being kept, from the deposition of oxychloride. It is true that, according to him, it is this excess of acid that prevents a further deposition of oxychloride, but in order to prevent the acidity of the liquor, would it not be better to employ a solution made extemporaneously from the dry chloride?

There is, it is true, one difficulty in the employment of the dry salt, namely, that the quantity of the solution required for an operation is always very small, but I have surmounted this difficulty by determining from experiment the proportions of perchloride of iron and water necessary to form solutions of the strength required for surgical purposes.

The following are the proportions for making solutions of certain densities indicated according to Baumé hydrometer:—

Chloride.	Water.	Density of solution.
53.85	46.15	45°
34.65	65.35	30°
21.30	78.70	20°
16.35	83.65	15°

The dry chloride contains about a fifth of its weight of water; it is therefore always easy to calculate the quantity of anhydrous chloride in the solutions. Thus those of the densities indicated by 45°, 30°, 20°, and 15° respectively, contain 43.10,—29.70,—17.05,—12.10 per cent.—*Journal de Pharmacie.*

ON THE PREPARATION OF RED OXIDE OF IRON SUITABLE FOR POLISHING GLASS AND METALS.

BY M. A. VOGEL.

There is commonly used for the polishing of glass and metals, a red oxide of iron (*Colcothar*, or *Caput mortuum vitrioli*), for the preparation of which there are many processes, including the heating of sulphate of iron to redness, either alone or mixed with common salt. All these processes are objectionable, which require long washing of the powder to separate the finer from the coarser and harder particles.

* This process is described at length in vol. iv., page 24, of the *Pharmaceutical Journal.*

Even after prolonged washing it is difficult to ensure absolute freedom from particles which may destroy the result of many weeks' labour. Hence a colcothar that can be used with safety is always much sought after, and sold at a high price.

These considerations induced me to seek for a new process for the preparation of colcothar, which might be better than that made in the usual way, however carefully it might have been washed.

After numerous experiments, I arrived at the conclusion that oxalate of protoxide of iron, decomposed by heat, affords the result required.

Oxalate of protoxide of iron heated in a close vessel with the exclusion of air, yields a pyrophorus, consisting of metallic iron in so fine a state of division, that it inflames on being brought into contact with air, passing thus into the state of red oxide of iron. This transformation takes place very rapidly when oxalate of iron is heated on a piece of platinum foil, exposed to the air, an operation in which the substance operated upon undergoes a considerable augmentation of volume.

The disengagement of the carbonic acid and carbonic oxide gases, which occurs at a high temperature, causes a very minute division of the particles, while at the same time the oxygen of the air is absorbed. The resulting oxide is therefore in the finest possible state.

The following is the best method of producing the colcothar by the process indicated: Into a solution of sulphate of iron made with boiling water and filtered, a concentrated solution of oxalic acid is poured, until the yellow precipitate of oxalate of iron is no longer formed. When the liquor has entirely cooled and ceased to deposit any more, the precipitate is washed on a cloth with hot water until the water ceases to acquire an acid reaction. The oxalate of iron, not yet perfectly dry, is in the next place heated on a plate of iron over a charcoal fire or a lamp. The decomposition of the salt commences at about 400° Fah., and at a temperature a little higher than this the red oxide of iron is formed in a very finely divided state.

The colcothar made in this way may be relied upon, as being in a state in which it may be safely and successfully used, without any previous washing, for polishing glasses for optical purposes.

The trials which have been made with this colcothar by manufacturers, for polishing metals, principally gold and silver, have shown that it produces a very fine polish without at all scratching the surface, on which account it is successfully used for polishing Daguerreotype plates, the reflectors of telescopes, and other objects of that sort. It has also been found that by its use the operaton of polishing glass is accelerated, the required result being produced in a much shorter time than it could be with colcothar made in the usual way.—*Journal de Pharmacie.*

IMPROVED APPARATUS FOR THE ANALYSIS OF COAL, AND FOR ORGANIC ANALYSIS GENERALLY.

BY J. H. ALEXANDER AND CAMPBELL MORFIT.

Early in October last, having to make an ultimate analysis of divers specimens of coal, anthracite and bituminous, we had abundant opportunity of observing the want of certainty and uniformity of result in the methods ordinarily recommended and practised for such analysis. With all these methods, where the aim is to induce the organic or other substance under analysis to give off its carbon by combustion, in glass tubes, with oxide of copper, chromate of lead or chlorate of potash, either separately or mixed; and where the effects arise under a simple play of affinities at a high temperature, and are unaided by any external force of mechanical agency, variations occur to such an extent as, in the case of anthracite coal especially, to leave the results, from several assays of the same sample, rarely identical. We have found these variations to depend, among other things, upon the grade of comminution of the matter for analysis, and its mode of intermixture with the oxidizing agents. If, for instance, the coal is too finely divided, it either protects or is protected by the reagents against the effect of the heat, although this may be so high as to fuse the tube and part of its contents. If, on the other hand, the coal be not finely divided enough, it protects itself. We all know the extreme difficulty of driving off the carbon from an anthracite coal, for example, even in an open crucible and over a blast, where sometimes three hours and more are

spent in reducing so small a quantity as 1 grm. to ashes; and as for the mode of intermixture which shall be most favourable for the exposure and contact of the greatest amount of surface between the material and reagent respectively, it is easy to see that, even after having been studied and attained in one instance, its repetition must be more the gift of good fortune than the result of any regular and unfailing manipulation.

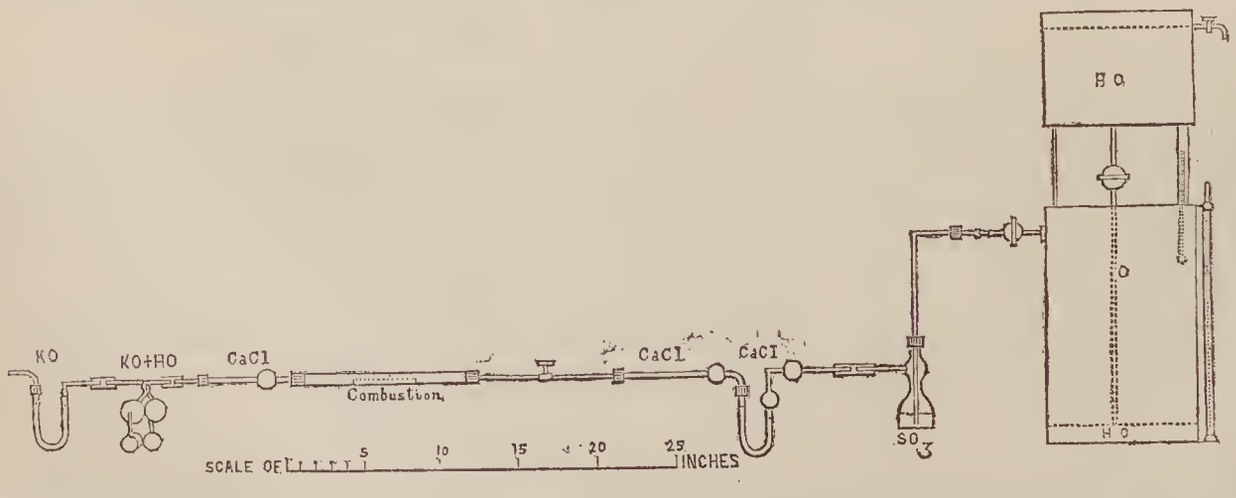
Again, in the ordinary methods, with whatever reagent, the heat necessary to be applied, and the apparatus for its application, prevent in a great degree, if not entirely, the experimenter from observing what is going on in the tube; so that he is left without any optical grounds, or indeed any grounds at all, beyond the cessation of bubbles in the potash bulbs and an inference from the lapse of time, for judging whether the operation is properly complete or not.

Finally, in any of these methods, the ashes of the matter being lost among the fragments of the reagents, there is rendered necessary, for the determination of this item, a partitioning of the original sample and a second special operation under all the scope for differences—slight, perhaps, but yet differences—which such partitioning always implies.

It was under these impressions, and with the view of remedying, to some extent, the defects which have been noticed, that we came to arrange and use the apparatus of which this note is intended to give the description. We have found in its employment that, both from the comparatively low temperature necessary, and from the mechanical mode of applying, and, when requisite, urging the reagent, the rate of the whole process comes under the strictest and most delicate control; that its progress is all the time distinctly seen, and can be judged of; and that the elements usually sought for in organic analysis (and especially in coals, for the purpose of ascertaining their probable heating power), are obtained from one and the same weighed portion.

Other advantages which we find it to possess—such as its convenience, being always ready after having been once arranged; its permanence, being not at all liable to get out of order with ordinary precaution; its economy, both as to the time of the experimenter and the money for combustion-tubes, which, in the former modes, answer but for one experiment and are then thrown away, while in this, the tube, except from some extraneous accident, never breaks, and answers for the hundredth experiment as well as for the first; and, finally, the quiet and composure of the whole process, undisturbed by any explosion or decrepitation—need not be dwelt on here. They, of course, will recommend themselves to the practical analyst, and are to be duly appreciated; but are not, in our opinion, to be spoken of in the same category with the main feature of accuracy and reliability of result.

The accompanying cut exhibits in section as much of the arrangement as appears necessary to its being clearly understood in connexion with the description following. The letters there are the chemical symbols to denote the occurrence and position of the several reagents employed.



On the right hand is seen a reservoir of oxygen, somewhat modified from the ordinary Pepys's gasometer. In this, the water-reservoir above is furnished with an outlet and cock (which during use are left open, in order to maintain a constant level), and is fed from another vessel of water, communicating with it in any convenient manner. We use a siphon. The water-reservoir is supported as usual by three stems; only one of them, as shown, is opened and widened to hold a

thermometer with a small range and open scale, whose bulb plunges into the oxygen-reservoir below, and serves to indicate the temperature of the gas. The water is allowed to pass into the lower reservoir of gas by a pipe and stop-cock, as usual; and the orifice of said pipe is also made to receive adjustages of varying bore, so as to regulate with considerable exactitude the rate of supply. Connected with the gas-reservoir is a glass tube, which usually indicates the level the water may have attained, and consequently the quantity of oxygen on hand; but in this instance it is intended to answer a more precise quantitative determination. On the tube are inscribed two scales; one, deduced from the known capacity of the gasometer and calibre of the tube, to show at once the number of cubic inches occupied by the water between any two stand-points on the scale, and, of course, when corrected for pressure and temperature, the corresponding volume of oxygen introduced or expelled; and the other, to show at any epoch the fraction of inches of mercury corresponding to the actual pressure of the water, counted downwards from the constant level in the upper reservoir (the design of which constancy is now apparent) to its stand in the tube, which fraction is convenient to be added at once to the observed barometric pressure, in order to give the total pressure under which the oxygen is delivered. With this total pressure and the observed temperature, the normal volume of oxygen used from epoch to epoch can be readily ascertained, the purpose of which ascertainment is, as will be seen presently, to have a check upon the numerical results otherwise obtained. This method of registering the quantity of oxygen used is not perhaps the best that could be devised, and leaves something to be desired on the score of minute measurement. But it was the most convenient application to the apparatus that we possessed; and as it can be read with a vernier to about one-tenth of a cubic inch (or $\frac{1}{300}$th of a grain in weight nearly), it is probably commensurate with the accuracy usually thought sufficient in checking a result furnished by other means.

With the stop-cock outlet in the upper part of the oxygen-reservoir, as seen on the left of the gasometer, is connected by a pierced cork one end of a right-angled tube that plunges its other end into a flask of strong sulphuric acid, through which the oxygen, as delivered, passes and parts with its moisture. The remainder of the moisture is supposed to be absorbed by the chloride of calcium contained in the next two tubes, as shown, the first of which, a double-bulbed U-tube, is connected by a caoutchouc wrapper with the branch proceeding from the upper tubulure of the sulphuric acid flask, and the small end of the second is bent at right angles, and is corked into the open end of the first. There is no particular virtue in these various bends and tubulures; they were used because the pieces happened to be at hand, and possessed, as we judged, the quality of containing a sufficient extent of chloride of calcium in a short linear space.

If our judgment as to this sufficiency is correct, the oxygen passes quite dry into the next small tube, furnished with a stop-cock, and connecting the last chloride of calcium tube with the combustion-tube itself.

This tube is needlessly long for the purposes it has to answer, which are in fact met by the stop-cock, but it happened to be on hand, and we did not desire to cut it. The purposes intended are threefold—1st, by shutting off the cock while the gasometer is open and oxygen is being delivered, to secure a sufficient residence of the oxygen in the chloride of calcium tubes for this gas to become dry—in fact, to secure a store of dry oxygen; 2nd, by a similar shutting off, to convert the combustion-tube into a tube closed at one end, and thus allow of any incidental moisture being drawn off with an exhausting-syringe in the usual way; and 3rd, by shutting off more or less, to regulate the flow of dry oxygen, or, if necessary, to cut off the supply altogether. When the experimenter has no assistant, the use of this stop-cock for regulation is more handy than the one on the gasometer; for the second purpose we have never used it ourselves, preferring to dry the combustion-tube and its contents by a sustained current of oxygen under pressure, from which there is no danger of vitiation to the result by introducing carbonic acid, as is always the case when a current of atmospheric air is employed in the same way; the first purpose is almost always advantageous, and in some cases indispensable.

We have now come to the combustion-tube, which is a piece of hard German white glass, open at both ends for receiving corks. This is lined for about one-third of its length in the middle with a helix of clean and bright copper wire, the purpose of which is to reduce any of the oxides of nitrogen that might be generated from the matter in combustion, and thus to secure the transmission of this element in a free state through the remaining channels of the apparatus. It will, of course, be gene-

rally proper to clean and renew the surface of this helix by any convenient method after each experiment. Resting on this helix is a platinum scroll of known weight, holding the matter for analysis, and retaining its ashes for being weighed after the combustion is completed. This combustion we have always so far effected with hand-lamps of alcohol, having Argand burners, the heat given by which is quite high enough to ensure in a few minutes the oxidation, in this atmosphere of oxygen, of all the carbon contained in a half gram, or even a gram of coal. To assist in the rapidity of oxidation, we found it advantageous to spread the mass of pulverized matter as thinly as possible over the surface of the platinum scroll. Instead, however, of these Argand burners, whose small extent renders the scintillating and perfectly-oxidizing temperature too local, we propose to employ hereafter a lamp with oblong hollow wick, extending over nearly the entire length of the combustion-tube, and separated by metallic diaphragms of sufficient height to prevent the spontaneous communication of flame from one to the other, so that each wick may be lighted successively as desired. This lighting should be commenced and the heat applied first at the end of the combustion-tube nearest the gasometer, on account of the great density of the carbonic acid produced, to assist in the discharge of which we have found it proper to give the whole apparatus, from the gasometer onward, an inclination downwards of about half an inch per foot.

The gaseous products of combustion pass off first into a chloride of calcium tube, whose smaller end is corked into the combustion-tube, and which retains the vapour of water from the hydrogen given up by the matter ; and next, into an ordinary quintuple bulb arrangement, containing a solution of potash, which takes up the greater part of the carbonic acid that has been formed. The remaining carbonic acid (such, for instance, as may have been formed and delivered from the combustion-tube faster, owing to some occasional irregularity, than could be absorbed by the potash solution, and which we have found in appreciable quantity) is caught by, and increases the weight of the fragments of solid potash contained in the U-tube on the extreme left of the apparatus.

Finally, to complete the design which has been indicated in the calibration and graduation of the oxygen-reservoir, must be imagined a bent glass tube connected with the last-mentioned U-tube at one end, and leading into a mercury-trough under a suitable receiver, where all the remaining gases from the combustion-tube are at last gathered. As these gases can be only oxygen and nitrogen, they may be transferred from the receiver into a Volta or other eudiometer, where the volume of oxygen is determined either by detonating with hydrogen, by platinum sponge, or any other eudiometric mode that may be preferred. The volume of oxygen being thus known, the volume, and consequently the weight of the nitrogen that was in the receiver, can be readily deduced.

In the mean time, the combustion being terminated, the platinum scroll, which now contains but the ashes of the matter, is withdrawn from the tube and weighed ; the difference between the weight now found and the original weight of platinum alone is that of the ashes.

We have now the weight of earthy matter and of the four principal volatile matters which constitute the coal directly determined. And by the use of the graduated scale on the gasometer, we have also a check upon the general accuracy of the whole operation ; for if the epochs have been carefully observed, the quantities of oxygen that by calculation must have been taken up in forming carbonic acid and water, should equal the whole quantity of oxygen directly observed to have been delivered from the gasometer during the process.

In illustration of what has been said as to the uniformity of results attainable by this method, we subjoin an extract from the note-book of weights obtained successively from two portions of the same sample of coal in two different experiments ; the chloride of calcium tube having been changed in the interval, so as to afford a quite different initial weight, and thus having prevented any possibility of preoccupation in making the weighings.

Quantity of coal taken in each experiment, 0.5 gram.

	I.	II.
HO	0.25 gr.	0.24 gr.
CO_2 in bulbs	1.59	1.61
CO_2 in U-tube	0.06	0.04
Ash	0.02	0.02

Baltimore, Jan. 20th, 1854.—*Chemical Gazette.*

INFLUENCE OF BORACIC ACID UPON SOLUTION.

Tissier* has published the results of some observations on this subject:—

Hydrate of lime is dissolved readily by a boiling solution of boracic acid; one part requires twenty-five to thirty parts of crystallized acid.

Calcined magnesia resists for a long time the solvent influence, but the ordinary *hydro-carbonate* is very readily dissolved.

Protoxides of iron and manganese are dissolved readily, the former by twenty-five to thirty, the latter by fifty or sixty parts of acid. The iron solution peroxidizes in the air, the manganese solution remains unaltered.

Oxide of zinc, even when ignited, is dissolved readily by fifty or sixty parts of acid.

Alumina peroxide of iron, &c., are not dissolved even when a salt of these bases is treated with borate of soda.

Carbonates of baryta, lime, and *magnesia* are not dissolved.

Phosphate of lime. When to a solution of phosphate of lime in hydrochloric acid is added an excess of boracic acid, and then so much borate of soda as will neutralize the acid by which the phosphate of lime is dissolved, no borate of lime is precipitated, but all the phosphoric acid is separated from solution in the state of phosphate of lime, of constant composition, corresponding with the formula proposed by Berzelius, 8 CaO, 3 PO_5, and containing 49.09 per cent. phosphoric acid, with 50.91 per cent. of lime.

BRITISH ASSOCIATION.

Meeting at Liverpool, September, 1854.

The Meeting at Liverpool has proved in every respect one of the most successful the Association has ever held. The number of new Members, and the attendance of old subscribers, was unequalled, while the character and number of the papers read was very encouraging. In the Chemical Section (B) much of the matter had no immediate reference to Pharmacy; but both in this and in section A. some valuable contributions to general chemical science were made.

The officers for the Chemical section were—

President—W. A. Miller, M.D., F.R.S., Prof. Chem. King's Coll. Lond.

Vice-Presidents—Professor M. Faraday, D.C.L., F.R.S.; Professor Thomas Graham, F.R.S.; Professor C. G. B. Daubeny, M.D., F.R.S.; Professor T. Traill, M.D., F.R.S.E.; R. Warington, F.C.S.

Secretaries—J. Baker Edwards, Ph.D., F.C.S.; J. H. Gladstone, Ph.D., F.R.S.; David S. Price, Ph.D., F.C.S.

Committee—E. Frankland, Ph.D., F.R.S.; F. C. Calvert, F.C.S.; G. R. Berry, Esq.; J. P. Gassiot, F.R.S.; E. A. Parnell, F.C.S.; W. H. Balmain, F.C.S.; David Forbes, Esq., F.G.S.; W. Francis, Ph.D., F.C.S.; Thomas Anderson, M.D., F.R.S.E.; A. Williamson, Ph.D.; D. B. Reid, M.D., F.R.S.E.; George Lowe, F.R.S.; George Hamilton, F.C.S.; E. Schunck, Ph.D., F.R.S.; Henry Deane, Esq.; Stevenson Macadam, Ph.D., F.C.S.; A. P. Price, Ph.D., F.C.S.; Andrew Crosse, Esq., F.R.S.A.; G. B. Buckton, F.C.S.; H. Bence Jones, M.D., F.R.S.; James Young, Esq.; Dr. Lyon Playfair, C.B., F.R.S.; J. H. Gilbert, Ph.D.. F.C.S.; T. Inman, M.D.

On the first day the reports furnished at the request of the Association by Dr. Gladstone and Dr. Hodges, of Belfast, were read. The former contained the result of experiments made by Dr. Gladstone, F.R.S., "On the Influence of the Solar Radiations on the Vital Powers of Plants growing under different Atmospheric Conditions." He found that the yellow ray diminished the growth of the rootlets and the absorption of water; the red ray also hindered the proper development of the plant, and the blue ray retarded the act of germination at first, and afterwards accelerated the growth of the plant, while total darkness caused a rapid and abundant growth of thin rootlets, prevented the formation of the green colouring matter, but not that of the blue flower, nor the other constituents of a healthy plant.

In the report of Dr. Hodges, "On the Gases evolved in Steeping Flax," was an examination of the merits of Schenke's process, which consists of steeping the flax

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* *Comptes Rendus*, July 24, 1854.

in water heated to 90° or 100° for ten hours, instead of in cold water, as by the ordinary method; in the latter case the process was long and uncertain, and as the flax is best separated from the woody fibre at a particular stage of the fermentation, it has to be watched with great care. The same fermentation occurs in Schenke's process, under more manageable circumstances, and the gases evolved prove to be the same in both cases.

James Turnbull, Esq., M.D., Physician to the Liverpool Royal Infirmary, read a paper "On the Physiological Properties of some of the Compounds of the Organic Radicals, Methyle, Ethyle, and Amyle." He had examined two compounds of methyle—the acetate of the oxide of methyle, and the iodide of methyle; four of ethyle—the acetate of the oxide of ethyle, the iodide of ethyle, the bromide of ethyle, and the cyanide of ethyle; two of amyle—the acetate of the oxide of amyle, and the iodide of amyle. The acetate of the oxide of methyle acted as a diffusible stimulant, and checked expectoration—a property common to most of the methyle, ethyle, and amyle compounds. The iodide of methyle produced all the physiological effects of iodine, and might be detected in the saliva and urine in half an hour after it had been swallowed. He had used it as an external remedy in scrofulous ulcers with advantage, and he had used it for inhalation in pulmonary diseases, to promote the healing of ulcers of the lungs; but for the latter purpose he had found another preparation, the iodide of ethyle, more serviceable. The iodide of ethyle he had found a warm stimulating remedy, which produced the physiological effects of iodine too, but was less stimulating. It acted as a powerful anæsthetic when inhaled, and he had ascertained that the injurious effects which Mr. Nunneley had observed from it had arisen from his having used an impure compound contaminated with phosphorus. He had used it internally in scrofulous diseases with advantage, and as its odour was perceived in the breath there seemed to be a special tendency to the elimination of this and other ethyle compounds through the lungs. As an external application he had found it more suited for painful and irritable ulcers than the iodide of methyle, which answered best for those of indolent character. He had used it for inhalation in many cases of pulmonary disease, and believed that it would prove more valuable for this purpose than any remedy yet introduced. Medical men had hitherto been disappointed in almost all the means tried for the treatment of pulmonary disease by inhalation. This proved that it was either an improper mode of treatment, or that they had not yet met with the right kind of remedies. He believed the latter to be the true cause of past disappointment. Iodine had been much tried, but laid aside on account of its irritating effects; and it had not occurred to any one that, in order to give it for inhalation, it would first be necessary to find a compound possessing the requisite degree of volatility and absence of irritative properties. Iodide of ethyle was, in his opinion, such a compound, and had much resemblance to chloroform. He believed that it would be found applicable for treatment in the way of inhalation of other diseases besides those of the lungs, and he mentioned one of dropsy from disease of the heart, treated under his care in the infirmary, where it produced a most beneficial effect. The bromide of ethyle he had found similar in its effects to the iodide of ethyle, more pleasant to the taste and for inhalation, but a very expensive medicine, from the difficulty of preparing it. The cyanide of ethyle he had found possessed the poisonous properties of cyanogen, and he had not therefore used it as a medicine. The acetate of the oxide of amyle and the iodide of amyle had also irritating properties, which rendered them unfit for use as remedies. His researches tended to show that organic radicals might be made to take the place of some of the inorganic radicals, such as sodium or potassium; that iodine, and probably other medicinal agents, were equally capable of producing in such combinations their external beneficial effects, and that, so combined, their volatile properties enabled them to be introduced into the system through a new channel hitherto but little used for such a purpose—viz., the lungs, upon which internal organs their local action might also be obtained in a more advantageous manner.

Specimens of these compounds, prepared by Dr. Edwards, were submitted to the section.

Professor Crace Calvert, of Manchester, made a communication "On the Physiological Properties of Carbo-azotic Acid," in which he stated that Dr. Bell, Physician to the Royal Infirmary, Manchester, had treated cases of intermittent fever most successfully with this new remedy, and he believed it to be a valuable

substitute for quinine. It was easily prepared from carbolic acid, which could be procured in any quantity.

Mr. R. Warington, F.C.S., observed that, by treating the "grass tree," or "black bay" gum, imported into this country from Australia with nitric acid, this preparation might be prepared, he thought, for about 1*s.* per lb. ; the gum being worth about 14*s.* per cwt.

Dr. Anderson, F.R.S.E., read a paper "On the Constitution of Meconine and Papaverine, and their Relations to the other Constituents of Opium ;" and another "On the Alkaloids produced during the destructive Distillation of Animal Substances." The former threw considerable additional light upon the bases of opium ; and both papers were very warmly received. Dr. Anderson also gave an account of some investigations by Henry How, Esq., in which the latter had in a very simple way obtained the hyposulphites of the organic alkalies.

George Hamilton, Esq., F.C.S., read a paper "On the Results of Experiments on the Preservation of Flesh Meat." The experiments arose in consequence of the inquiries of mercantile gentlemen in Liverpool, who were desirous of bringing cargoes of beef in a fresh state from South America. The experiments and their results were enumerated in the paper. The following are the principal experiments, with their results :—Experiment 5. Placed a piece of beef, weighing about 8 oz., in a stoppered bottle, the beef being supported by a piece of wood thrust through it. The bottle was filled at the pneumatic trough with binoxide of nitrogen. Result : At the end of twenty-one days the colour was not changed ; there was a faint odour of nitrous acid ; and the beef was perfectly fresh and good. This was the principal experiment, with its results, in the first series ; there were others, such as placing the beef over a layer of chloride of lime, in a glass bottle filled with chlorine, and in a bottle of ammonia, but they were not successful in preserving the meat. The conclusions which Mr. Hamilton drew from these and other experiments were, that the fumes of chloride of lime will not preserve meat from putrefaction ; that chlorine gas cannot be employed to preserve from putrefaction meat intended for human food ; that ammonia cannot be employed to preserve meat, since it imparts a repulsive taste and odour ; that binoxide of nitrogen preserves beef from putrefaction for at least five months. The meat retains its natural colour and consistence almost perfectly unchanged. The gas is absorbed into the pores, and the juice of the meat exudes. The quantity of the juice lost is great when the volume of the gas bears a large proportion to the volume of the beef, and the loss is augmented by exposure to light. The loss is least when these two conditions are reversed. But, on the other hand, when the volume of the beef bears a very large proportion to the volume of the gas, the beef will not be preserved at all. The meat preserved in binoxide of nitrogen, when cooked by roasting, has a disagreeable acid taste ; when cooked by boiling the ebullition must be continued at least twice the usual length of time required for fresh meat, and the water must be changed until there is no longer an odour of nitrous acid. The meat has a fresh, tender, and agreeable flavour. The results of other experiments indicated that the injurious action of binoxide of nitrogen could be much modified by an admixture of nitrogen.

Professor Calvert informed the section that carbolic acid was highly useful as an antiseptic, and that a bird-stuffer of his acquaintance, in Manchester, preserved the skins of birds by washing the insides with this acid. Its application was also very useful in dissections, for the difficulty of preserving the corpse was effectually overcome by injecting carbolic acid mixed with water. This application also did not affect materially the appearance of the tissues, which was one of the main difficulties in preserving a corpse for dissection. The acid, Mr. Calvert further said, could be procured for about 2*s.* a gallon.

The Abbé Moigno described a mode of preserving milk which he had found very effectual, both milk and cream having been preserved sweet and sound for six months. The vessels used were cylindrical iron bottles, each fitted with a leaden tube at the top. The bottle and tube having been filled at the boiling point with milk, so as to exclude the atmospheric air, the latter was pinched a little below the top, so as to close it completely. It was then cut off at the part pinched ; and the bottle and what part of the tube remained being entirely free of air, no decomposing action could possibly ensue. On the plans previously adopted, it had always been found inevitable to enclose a little air (seen by the bubble), so that it was necessary to expose it to a high temperature, in order that the oxygen in that bubble might be absorbed by the organic substance.

Andrew Crosse, Esq., read a paper "On the apparently Mechanical Effects accompanying Electrical Transfers." The deduction which Mr. Crosse drew from a variety of interesting experiments was, that a sudden disturbance of the fluids electrically acted upon was a powerful agent in the formation of minerals. By increasing the mechanical action of a fluid he had found most perfect crystals formed, contrary to the generally received notions of crystallography, that a state of the most perfect quiescence was required. He had found that boiling solutions kept up for three weeks formed the most perfect crystals.

Some very interesting experiments were made by J. P. Gassiot, Esq., F.R.S., "On the heating Effects of secondary Currents."

Professor Calvert read papers "On the Action of Gallic and Tannic Acids on Mordants and on Metallic Iron;" and "On the Action of certain Organic Acids on Cotton and Flax Fibres."

G. Sims, Esq., described the results of certain investigations which he had made, showing the presence of iodine and bromine in native borate of lime from South America. The iodine, he explained, existed only partially, some pieces being destitute of it, while others were very rich. Nor was it in a free state, but in combination with soda.

In answer to a question by Mr. Anderson, Mr. Sims said that the samples which he had obtained varied considerably in their character, in some there being 50 per cent. of borate of lime, in others but 20.

Professor Anderson remarked that, if a large supply could be obtained, it was a matter of great commercial importance; as, if borax could be got at a cheaper rate, it could be largely employed in the arts.

Mr. Sims could give but little idea as to the quantities in which the product might be found.

Mr. Balmain said that, since the discovery of the borate of lime not more than three or four tons had been imported into Liverpool, and that he had no hopes of getting it in any large quantities.

A paper was read by R. Warington, Esq., F.C.S., "On the Production of Boracic Acid and Ammonia by Volcanic Action." After giving a description of an island called Volcano, about twelve miles north of Sicily, which had been visited and examined by a friend some years since, who passed a fortnight there for the purposes of this inquiry, Mr. W. stated that a large deposit was found of finely crystallized boracic acid. On removing the incrustation, which formed a layer of about an inch in thickness, and digging with a pick-axe, there sprung up a mass of red-hot fused lava, similar in appearance to the slag of a glass-house. This consisted of fused saline matter in cohesion with volcanic débris. In other parts of the crater there were holes like foxes' holes, from which blue jets of volcanic flame were issuing continually, and a deposition of sulphur occurred all round.

The boracic acid rises in vapour, and condenses on the surface of the ground at the bottom of the volcano, like a light drifted snow, and when gathered up, the surface becomes covered again in two or three days. To ascertain this point more decidedly, some hogshead casks, having their heads removed, were filled with broom-plants and twigs, and were placed over parts of the area from which the boracic acid had been carefully cleared away; in a few days the acid had been vapourized into them, and had deposited in crystals all over the twigs like hoar frost. On digging down for about eight inches, wherever this boracic acid occurs on the surface, a red-hot mass of sal ammoniac is always found; sulphur comes up also with these.

Papers were read by Professor Graham, F.R.S., "On the Concentration of Alcohol."

By Dr. Gladstone, F.R.S., "On the Fluorescence exhibited by certain Iron and Platinum Salts."

By Dr. J. B. Edwards, "On Collodion Photographs of the Moon's Surfaces." The author, in conjunction with Mr. J. A. Forrest and Mr. Hartnup, had been engaged in taking photographs of the moon by the Liverpool telescope, some of which were exhibited, together with enlarged copies, to the Members of the Association.

An interesting communication was made by Dr. F. Wrightson, "On the Sewage of Manufacturing Towns," in which he referred particularly to Birmingham, stating his conviction that the freedom of that town from cholera is due to the healthy and absorbing influences of the particles of iron, &c. educed from the smoke, and mixing with the sewerage.

Dr. Stevenson Macadam read a paper "On the Distribution of Iodine in the Mineral, Vegetable, and Animal Kingdoms." The author stated that an experiment where 100,000 cubic feet of air were analyzed, and one recently undertaken by him, where fifty gallons of rain water were examined, having given a negative result, he was inclined to think that other and more carefully conducted experiments were required before the statement advanced by Chatin—that an appreciable amount of iodine was present in our atmosphere—could be admitted. The author had found a trace of iodine in 100 gallons of water used for domestic purposes in Edinburgh, as also in about sixty land plants, some of which were edible, such as potatoes, wheat, barley, oats, beans, peas, pears, apples, and gooseberries. The presence of iodine in the food of animals necessitated its introduction into the system of the animal, and, for a time at least, its retention there. The author accordingly found iodine in the cat, the dog, the pig, the cow, the horse, and man. No direct experiments had been made on soils, but considering that iodine is uniformly a constituent of limestone rocks, and that these are always present in and applied to soils, the author believed that the latter must, to a greater or less extent, contain iodine.

Dr. J. H. Gladstone, F.R.S., read a paper "On a Method of Analysis applicable to the Quantitative Estimation of Nitric and Acetic Acid." The process is as follows:—Place a weighed portion of the substance to be analysed in a small tubulated report, and dissolve it in a little water. It will be remembered that all neutral nitrates are soluble; the few sub-nitrates which are insoluble in water should be reduced to a very fine powder. Add to the solution in the retort a large quantity of strong sulphuric acid, very many times more than is requisite to effect the decomposition of whatever nitrates may be present. Attach to the beak of the retort, in such a way as to preclude the escape of any gas, a receiver containing water and a considerable quantity of carbonate of baryta. Heat the liquid in the retort gently at first, but more strongly towards the end of the operation. The nitric acid, of course, distils over, and will be condensed wholly in the receiver, which, together with the neck of the retort, should be kept cool. There it will decompose the carbonate, forming nitrate of baryta, while the liquid will be ever ready to absorb or receive fresh increments of acid. The distillation should be continued till the sulphuric acid itself rises in vapour and sweeps down the nitric acid which may be adhering to the neck of the retort, and showing itself in the receiver by the production of a dense white cloud from its decomposing some of the nitrate of baryta in solution. This decomposition is of no moment, as the nitric acid thus set free immediately decomposes in its turn an equivalent of the carbonate of baryta. After shaking the liquid and filtering away the sulphate and undissolved carbonate, a clear solution of pure nitrate of baryta is obtained. This may be evaporated to dryness and weighed; or, as the salt is rather apt to decrepitate when heated, it will be found preferable to convert the nitrate into the sulphate, and from that to calculate the amount of nitric acid which passed over into the receiver.

Mr. Henry Deane exhibited and explained the sterioscopic cosmorama lens designed by Mr. George Knight. This is a modification of the beautiful instrument invented by Sir David Brewster. The improvement consists in employing, in place of the two small semi-lenses, one large one, which is rendered sterioscopic by cutting an ordinary plano-convex lens in half, removing more or less of the opposite outer diameters, and then transposing the pieces, so that the original centre of the lens becomes the two sides, and the outer edges come together in the middle. The advantages obtained by this arrangement is an increased facility for viewing as one the double pictures; only one adjustment is necessary for all sights, by increasing or diminishing the distance between the lens and the double picture. By using larger lenses of proper focal length, pictures of larger dimensions may readily be viewed sterioscopically.

Dr. Stephenson Macadam, Ph.D., F.C.S., read a paper "On the Cause of the Phenomena exhibited by the Geysers of Iceland." These geysers were in the vicinity of a volcanic mountain, and beneath them large caverns, heated by volcanic influence, received the gradual drippings of water through the fissures of the earth, which, becoming heated, forced its way up, first in hot water and then in steam. The condensed water he considered might be injected thus into basins intensely heated, and assume the spheroidal condition, the sides of the basin being coated with vitreous silica. When these cooled, the water being suddenly converted into steam

by contact with the sides, would produce a violent evolution of water and steam, similar to the phenomena described in the geysers.

J. Spence, Esq., of Manchester, read a paper "On the Production of Sulphurous Acid Gas from the Consumption of Coal." He described the "smoke nuisance," which he certainly considered anything but agreeable, as most people had a great dislike to a smoky atmosphere; but the question which arose was, whether the abolition of it might not have *an evil tendency in a sanitary point of view!* It was considered that carbon was a healthy agent, and its removal might leave bad gases to produce their evil effects upon the population, which the existence of carbon would remove. He instanced the smoke-consuming movement in Manchester, and observed that vegetation in the neighbourhood was destroyed, by the absence of carbon causing the sulphur arising from the consumption of coal to pass into sulphurous acid gas, which was extremely pernicious. This paper produced some discussion, at the conclusion of which, Mr. Lowe observed, that parties who did not admire smoke, might obviate the inconvenience by consuming gas coke, as was done in the noble hall where they had assembled.

(Mr. Spence did not appear to convince the Section of the advantages of a smoky atmosphere in a sanitary point of view, many members being obstinately disposed to retain their preconceived opinion, that even Manchester might be benefited by a clear, bright, *smokeless* atmosphere.)

Reports on the following subjects will be prepared for the next meeting, which will be held in Glasgow:—The Chemical Action of Solar Rays, by Robert Hunt, F.R.S.; Solar Radiation on Plants, Dr. Gladstone, F.R.S.; Chemical Manufactures in Glasgow, Dr. T. Anderson, F.R.S.E.; Electro-Chemistry, by Dr. W. A. Miller, F.R.S.; Chemical Affinity, Dr. Williamson; Chemical differences of Iron, Dr. D. Price; The process of Tanning, Robert Warington, F.C.S.; On Flax Fibre, Dr. Hodges.

AMERICAN PHARMACEUTICAL ASSOCIATION.

We omitted last month, on account of pressure of other matter, to report the Annual Meeting of this Association, which was held in July, 1854.

We regret that we are not able to give more than a very short notice on the present occasion, but must refer our readers to the September number of the *American Journal of Pharmacy*, which contains a full report of the proceedings.

The first sitting took place on the 23rd of July. In the absence of the President, W. A. Brewer, one of the Vice-Presidents, C. B. Guthrie, presided, and E. S. Wayne was appointed Secretary *pro tem.*, in place of Edward Parrish, of Philadelphia, absent. Several active Members were absent, on account of illness or the prevalence of cholera requiring their presence at home. Committees were appointed as usual to examine credentials, receive the names of the delegates from various localities, and for other duties.

The reports of committees appointed last year were received, among which were the following:—A report from Mr. Geyer, of Boston, on a proposed certificate of membership, accompanied by a design emblematic of the art and science of Pharmacy, and a certificate stating that the American Pharmaceutical Association, having confidence in the holder, has elected him a Member.

A report of the committee on education, comprising—1st. A draft of an address to the Pharmaceutists of the United States on the subject of education in the shop. 2nd. A copy of a circular issued by the committee to gather information relative to the condition of education among Apothecaries. 3rd. The answers to these circulars tabulated for reference. 4th. The report on quack medicines specially referred last year. 5th. A report on the expediency of endeavouring to obtain congressional action in reference to the mode of appointing drug inspectors. 6th. The report of G. L. Simmons, of California, on the condition of apprenticeship in that State.

The Address on the subject of Education in the shop is an interesting document, but our space does not admit of its insertion.

The following suggestions from the report on quack medicines are deserving of attention:—

"1st. That the desire for medicine can be gratified in a legitimate way by regular officinal preparations. 2nd. That it is the duty as well as interest of the Apothecaries and Druggists to advocate the use of the officinal medicines in lieu of the

quackery of the day. 3rd. That it is the rightful interest of regular Pharmaceutists to divert in this manner the thousands which now annually flow into the coffers of quacks into their own limited stores, where of right it belongs. 4th. That this can only be done by a united and sustained action on the part of the Pharmaceutists and Druggists of the Union, by which they will practically refrain from the sale or advocation of secret medicines, and substitute regular officinal compounds for them, with name and directions for use. 5th. That this course should receive the sanction of Physicians as the only one likely to remedy the evil aimed at, as the tendency to take medicine *ad libitum* is a feature of the Anglo-Saxon race duly inherited by the American people, and whatever may be its faults, it is as much their nature as is the love of political and personal freedom."

Many other subjects of considerable interest occupied the attention of the Association. We must not omit the following resolutions founded on the report of the committee on prizes: It was resolved, "That a copy of twenty volumes of the *American Journal of Pharmacy* be offered for the best essay which shall develop the commercial history of all drugs indigenous to the United States, as senega, spigelia, serpentaria, &c., as regards the manner and places of their collection and preparation for the supply of commerce, the amount annually collected, and the channels through which they enter general commerce." "That a copy of the inorganic portion of Gmelin's *Handbook of Chemistry* (as published by the Cavendish Society in six volumes) be offered for the best essay on the question, 'Do Hyoscyamus, Belladonna, and Conium grown in the United States contain their active principles in the same proportion as the European grown plants ?'"

The Association at its rising adjourned to meet in the city of New York on the second Tuesday in September, 1855.

EARLY CLOSING MOVEMENT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I am satisfied your sense of justice will induce you readily to publish a reply to the leading article upon the above subject, which appeared in the last number of the *Pharmaceutical Journal.*

You appear to have felt it your duty, as a public journalist, to take exception at a circular bearing my signature, and addressed to the "Assistant Chemists of London and its Suburbs."

You charge me—

First, With having adopted a tone of language which is calculated "to place Principals and Assistants in an antagonistic position."

Second, With "seasoning" the circular by the use of strong expressions—"such as imprisonment, servitude, bondage," &c.

Third, With an intention to publish in the pamphlet about to be prepared, a series of libels against Principals, "resulting from a system of espionage carried on under their own roofs by their Assistants."

Now, although it is generally far easier to prefer charges than logically to refute them, however groundless they might be, I yet do not despair of justifying what I have written to the satisfaction of most of your readers. At the outset I would utterly disclaim having any desire to set Assistants in array against their Employers, and I venture to state that the very opposite results are likely to ensue from every effort that is made to abolish late hours of business—a system whose direct tendency is to sour the temper of all who are exposed to its influence, and to spread bad feeling and discontent throughout every establishment where it prevails. A proof, not less conclusive than gratifying, of the correctness of the above opinion is supplied in the history of the Early Closing Association. Previously to the formation of that Society, generally speaking, not the slightest sympathy existed between Employers and their Assistants, whereas now, in most cases, the best possible feeling subsists between them. I here refer only to those departments of trade upon which the influence of the Society has been successfully exercised.

With regard to your objection to certain phrases which I have employed, I would beg to observe, that I think it would have been more generous and fairer, more in accordance with the "golden rule," had you printed the circular *in extenso*, instead of selecting isolated expressions. I am, however, quite prepared to stand by the

terms which I have employed, even in the form in which they appear as quoted by you. I presume it will not for a moment be maintained that there is anything essentially reprehensible in the words "imprisonment," "servitude," "bondage," but only that they are wrong when misapplied. Let us see, therefore, whether or not their present application to the condition of the Chemists' Assistants be correct. You, Sir, have well described that condition in a leading article upon the subject, which was published in the August number of the *Pharmaceutical Journal*. The following are your words :—

"Their usual hours of business, *seven* days in the week, are from 7 A.M. until 11 P.M., with the liability of being called up in the night in cases of emergency."

Now the simple question is, Is such condition, in plain honest English, one of "imprisonment," "servitude," "bondage"? I think that but few persons, upon reflection, will be found to deny that such is its real character. If so, why hesitate thus to designate it? For my own part, whilst ever wishing to avoid needlessly giving offence, I yet always think it better to call things by their right names.

I now come to your third and gravest charge, that of my having recourse to a system of "espionage." Permit me here to remind you that in the September number of your Journal, at page 141, you published an abstract of our proposed "plan of procedure," and so far then from disapproving of the measures therein embodied, you expressed yourself in a manner the directly opposite. The following is an extract from what you there published :—

"The Hon. Secretary read his plan, which was to the following effect: 1st, To prepare a pamphlet containing a plain statement of the grievances endured by Chemists and Druggists' Assistants. * * * The pamphlet to contain *individual cases of hardship*," *&c.*

Referring to the subject of this report in a leading article in the same number of your Journal, whilst cautioning us against having recourse to intemperate language and a dictatorial tone, you speak approvingly of "a reference to *plain matters of fact*," and give it as your opinion, that "a good result may be anticipated" from "publicity" being given to "the facts of the case" by certain means, amongst which you include the "pamphlet" about to be issued, which, be it remembered, is announced as intended to contain "a plain statement of the grievances endured by Chemists and Druggists' Assistants," together with "individual cases of hardship," &c. It is clear, therefore, from what you have here written, that you do not object to, but on the contrary approve of, our disseminating information illustrative of the condition of the Assistants. Now, as I am not myself a Chemist, and as I could not acquire the necessary information by intuition, permit me to inquire how I was to become possessed of it, excepting through the aid of those practically engaged in the business, and thus by experience familiar with the various evils appertaining thereto?

My reason for promising that "no names will be allowed to transpire," was because my experience convinced me that without such assurance the majority of young men would be afraid to put themselves into communication with me upon the subject.

My reason for wishing to have the *names* of those furnishing the sought-for information was simply to avoid circulating any *exaggerated* statement, which I could not be sure of doing if I gleaned my information from an anonymous source. In my simplicity, I was really prepared for my precaution eliciting praise rather than censure, it being, in fact, in substance precisely that which we constantly see inserted in the most prominent part of the leading Journal of the day :—

"* * * Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith."

Strangely enough, you seem to imagine that certain houses will be mentioned by *name* when information respecting them shall have been obtained. I can come to no other conclusion than this after reading one of the passages in the leading article of the October number of your Journal, as you therein speak of our anticipating "actions for a series of libels against Principals." Now I beg here most emphatically to state that I never had the slightest intention of specifying any Chemist's establishment in connexion with the information about to be published. To thus specify them, clearly would virtually be to publish the names of the young men furnishing the information, in which case our promise of privacy would be neither more nor less than a base imposture, of which, it is trusted, the antecedents of the Early Closing Association and its officers, go far to prove them incapable.

I would just remark that what we require is simply *reliable* particulars, which will be *generally* descriptive of the condition of the Assistant Chemist. We believe there are other grievances which they have to endure, besides the monster one of excessive toil. It is possible that some of these are, at least for the present, irremediable ; but, if so, it is yet well that they should be disclosed, as so many additional reasons why those should be abolished which are capable of abolition.

Does some one ask, "Why trouble yourself to collect particulars upon a subject respecting which Chemists themselves are already sufficiently well informed ?" my reply is, that it is not the Chemists whom we seek to enlighten, but the public, without whose aid I am well persuaded the monster grievances of the Assistant Chemist will never be thoroughly redressed. With me this is no new question. Long experience in the case of other trades has proved that entire unanimity amongst a large body of employers is not to be attained upon the question under consideration, nor indeed upon any question. Now the power of the opposing parties can be neutralized only by means of public opinion and public influence.

Trusting that the above will be deemed a satisfactory explanation of the portions of the circular which have been disapproved of,

I have the honour to be, Sir, your obedient servant,

JOHN LILWALL,

Honorary Secretary of the Early Closing Association.

32, *Ludgate Hill*, 19*th October*, 1854.

BOOKS RECEIVED.

A TRANSLATION OF THE NEW LONDON PHARMACOPŒIA, INCLUDING ALSO THE NEW DUBLIN AND EDINBURGH PHARMACOPŒIAS, *with a full Account of the Chemical and Medicinal Properties of their Contents; forming a complete Materia Medica.* By J. BIRKBECK NEVINS, M.D. Lond., M.R.C.S, &c. &c. Second Edition. London: Longman, Brown, Green, and Longmans. 1854. 8vo, pp. 880.

THE BOOK OF PRESCRIPTIONS; *containing* 2900 *Prescriptions, collected from the Practice of the most eminent Physicians and Surgeons, English and Foreign; comprising also a compendious History of the Materia Medica of all Countries, alphabetically arranged, and Lists of the Doses of all officinal or established Preparations.* By HENRY BEASLEY. London: John Churchill, New Burlington Street. 1854.

THE CLIMATE OF BATH, IN REFERENCE TO PULMONARY CONSUMPTION. By JAMES TUNSTALL, M.D., &c. London: John Churchill. Bath: Samuel Hayward, Abbey Churchyard. 8vo, pp. 136. 1854.

ELEMENTS OF CHEMICAL AND PHYSICAL GEOLOGY. By GUSTAV BISCHOF, Ph.D., Professor of Chemistry and Technology in the University of Bonn. Translated from the Manuscript of the Author, by BENJAMIN H. PAUL, F.C.S., and J. DRUMMOND, M.D. Vol. I. London: Printed for the Cavendish Society. 1854.

MICROSCOPIC NATURE AND RATIONAL MEDICINE: *the Substance of Two Letters addressed to Professor R***.* By E. G. SWANN. London: Published by James Leath, 5, St. Paul's Churchyard, and 9, Vere Street, Oxford Street, 1854.

TO CORRESPONDENTS.

THE EARLY CLOSING MOVEMENT.—We have received a copy of the following circular :—

"NOTICE.—The public are respectfully informed that we, the undersigned Chemists and Druggists in the neighbourhood of Tottenham Court Road and Hampstead Road, hereby mutually agree to close our establishments on and after the first day of November next, at ten o'clock every night (Saturdays excepted), and on Sundays from eleven A.M. until six P.M. N.B. Prescriptions and medicines of an urgent nature may be obtained at any hour. *Dated this* 18*th day of October*, 1854. William Bower, 96, Tottenham Court Road ; E. B. Phillipson, 116, ditto ; R. Ross, 168, ditto ; J. M. Grisdale, 216, ditto ; C. R. Rowland, 260, ditto ; George Morris, 70, John Watts, 6, Sols Row, Hampstead Road ; R. C. Cobb, 10, Frederick Place, Hampstead Road ; George Stevens, 11, Gower Street North ; William Edwards, 13, Goodge Street ; Alex. Maitland, 8, Torrington Place ; A. F. Macauley, 32, Francis Street ; Thomas Burden, 6, Store Street."

Mr. Kenwrick (Birmingham) recommends a plan which he has adopted himself to facilitate the partial closing of Chemists' shops on Sunday, the following notice being printed on the shutter:—"Open on Sunday mornings from nine till ten, evenings from six till seven, for the supply of medicines."

"*A Young Assistant*" (Manchester) complains of the obstacles thrown in the way of study and the attendance of lectures by young men, whose employers do not allow them the requisite time. The letter is in substance similar to many which we have already published. Such communications should be placed in juxta-position with others which we occasionally receive from employers, complaining that their young men will not take the trouble to study or attend lectures, in spite of all the facilities given and arguments used to induce them. The inconvenience arises from the want of "Chemical affinity" between the Principals and their Assistants, which might be remedied by a mutual exchange, or (as it is called in chemical language) "double decomposition."

A Student (London).—(1.) The crystallization of syrup is occasioned by excess of sugar. See vol. ii., p. 448.—(2.) No.—(3.) Perfumers prepare grease for the hair by their own formulæ—marrow melted, strained, and mixed with oil; prepared lard; sometimes bear's grease, &c.

C. R. B.—The privilege is often allowed under proper restrictions, which the parties concerned must settle between themselves.

M. P. S. (Sittingbourne).—(1.) Beasley's *Druggists' Receipt Book* contains the information required.—(2.) Essence of Bergamot.

An Associate (Richmond).—Triturate the camphor with the oil.

L. F. F. (Stevenage).—We know of no solution answering the conditions required.

An Apprentice, R. A. (Birmingham).—*A Student.*—Fownes's *Manual of Chemistry*, 12*s.*, and the London Pharmacopœia.

Mr. Fawcett omits to state the nature of his "invention." Until this is explained, his "soluble essences" are private nostrums, and as such could not be noticed by the Committee.

Thomas Cotton.—The error in the figure was only on the cover. Very few were printed before it was corrected. It was quite accidental if any of the former were sent out.

H. J. (Colnbrook).—*Colours for Show Bottles.* See vol. x., page 92.

A Chemist's Assistant (Bury St. Edmund's).—Application should be made to the Secretary at War, the Duke of Newcastle.

Omega.—For information on the means of obtaining paraffine from peat, see vol. x., page 477, of this Journal.

Amor Scientiæ.—(1.) For the different methods of making oxide of zinc by precipitation, and the nature of the products, see vol. ii., page 506.—(2.) The products are the same.

R. M.—Benzoic acid is made from Benzoin. We know of no data from which to estimate the quantities annually manufactured.

A. D.—Essence of lemons when exposed to the air becomes partially oxidized, and a brown resinous substance is sometimes deposited, which may have caused the appearance referred to.

A Constant Subscriber (Hull).—We are unable to afford the information.

A Dispenser.—Cocoa oleine is the fluid part of cocoa-nut oil separated from the solid part.

C. G.—We know of no better method of removing the stains of tannin than that mentioned.

Erratum.—Vol. xi., page 431, third line from the bottom, *for* ℥xxviij. *read* ℥xxviij.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. VI.—DECEMBER 1st, 1854.

THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

THE ARGUMENT BEFORE THE JUDGES.

The argument before the judges in the Court of Queen's Bench was commenced on Saturday, the 18th of November, and concluded on Wednesday, the 22nd. The decision of the Court was deferred. The argument occupied altogether about six hours, and was substantially a repetition of the case previously tried before the Court, and reported in this Journal, vol. xiv., p. 42.

It would be tedious to read, as it was to hear, the entire thread of the argument on both sides, twisted as it was into every shape that the ingenuity of special pleading could suggest, mystified by endless repetitions, and assuming in turn every colour of the rainbow, according to the aspect in which it was presented to the mind's eye, yet wanting a clear development of certain facts which the evidence adduced on the former occasion failed to place before the Court, and which were required to show the real practical bearing of the arguments in reference to the welfare of the public and the purposes contemplated by the Pharmacy Act.

To any person unacquainted with the antecedents, the *modus operandi* of the Act, and the object of the attack upon the Society, the pleadings must have appeared to be enveloped in a cloud of mystery more dense than a November fog. We have not thought it at all necessary to weary our readers with a detailed report, which would occupy at least one number of this Journal, but it may be expected that we should give a brief outline of the general scope of the arguments.

Sir Fitzroy Kelly commenced by recapitulating, at much length, the facts detailed in the special verdict, with extracts from the Charter, the Bye-laws, and the Act, the address of the Council to the Chemists and Druggists of Great Britain, and the particulars of the return of the Registrar to the writ of *mandamus*. The learned Counsel then proceeded to state that the Act of Parliament had brought into existence a class of persons called Pharmaceutical Chemists, who did not previously exist, and had ordered a register of these persons to be kept. The point of law on which he chiefly rested his case, and which he repeated at least twenty times, was this, that while the Charter enumerated four classes of persons as eligible for admission as Members, namely, persons who were in business at the date of the Charter, or who had been examined, or certified to be duly qualified, or elected as Superintendents, the Act recognized only two classes of persons as being eligible to be placed on the register of Pharmaceutical Chemists, namely, those who were Members at the date of the Act, and those who had passed the examination according to the tenth section of the Act. The object of the register he stated to be, to enable the public to distinguish between persons qualified for their business and persons not worthy of the confidence of the public, so that if, for example, he (Sir Fitzroy Kelly) were to go to reside in Exeter, and desired to know whether John Tomkins, a Chemist, were competent to be entrusted with the responsible duty of dispensing prescriptions for himself and his family, he might, by application to the Registrar, ascertain whether the name of the said John Tomkins was there or not. But the Council of the Society having elected without examination nearly 1000 persons as Members, and placed their names on the register in violation of the terms of the Act, the register was not only useless but *mischievous*, as the answer of the Registrar to the above inquiry might induce him (Sir F. Kelly) to repose

confidence in a person possessing no qualification whatever, and thus the health and even the lives of himself and his family might be placed in jeopardy. (The learned Counsel introduced this illustration with a solemnity which produced a dramatic effect upon the Court.) He did not on that occasion dwell upon the impropriety of the election of the Members who had been elected without examination, although he did not admit the legality of such election. It might be a matter of indifference to some persons whether they were Members or not. They might be satisfied with registration as Pharmaceutical Chemists. That was the important register to which his present arguments referred. It might be desirable to the Society to swell the list of Members for the sake of obtaining large fees; but this, while he believed it to be illegal, was not at that time the question in dispute. By way of illustration, he put a hypothetical case of a new law for the registration of qualified barristers, and described the effect of adding to that list the names of persons not qualified according to law. An Act of Parliament must be construed according to the legal meaning of its provisions, and no Bye-laws could justify a departure from the terms of an Act of Parliament. If the Council were at liberty to elect any persons as Members, whether qualified or not, whether Chemists or not, without examination, and to place the names of such persons on the Register of Pharmaceutical Chemists, then the Act of Parliament would become a dead letter, its object would be frustrated, and they might as well have continued as heretofore, a voluntary society without any Act at all. The preamble of the Act recognized no exceptions; it asserted that "it is desirable that all persons, before assuming such title, should be duly examined," &c. There was no provision sanctioning a departure from this principle laid down, and the registration of the new Members, without previous examination, was a violation of the provisions of the Act.

Mr. Bramwell commenced his reply in a remarkably clear and straightforward manner. He asked permission of the Court to digress for a few moments from the points of law which had been raised, to advert to the merits of the case. The Society, which was altogether voluntary, had been originated by a few individuals who were desirous of raising the character and status of their profession. They had, in the first instance, applied for and obtained a Royal Charter, and had established an examination and other measures for promoting the object which they had undertaken from disinterested and praiseworthy motives, and not, as stated by the learned Counsel on the other side, for the purpose of obtaining fees. In due time they had obtained an Act of Parliament which confirmed the Charter, save as altered, and gave them additional powers. The four classes of persons enumerated in the Charter were recited in the preamble of the Act, a register of Pharmaceutical Chemists was provided for, and it was enacted that all the existing Members should be placed on this register, as well as all persons who should pass the examination, but it was not enacted that no other persons should be placed on that register. Such a provision would have been at variance with the principle adopted in reference to the Apothecaries Act of 1815, which admitted all persons then in practice to the privilege of Apothecaries. It was true that the preamble stated it to be desirable that all persons, before assuming the title, should be duly examined. Everybody knew that it was desirable, but this was stated prospectively, and could not possibly be immediately brought into operation. Had it been otherwise, it would have been an *ex post facto* law, and unjust as well as unconstitutional. If the interpretation adopted on the other side had been the correct one, a Chemist having been carrying on his business creditably and honourably for years might have been thrown into comparative discredit by the establishment of a man in the same street, under a title which he was unable to assume, simply because he had not thought proper to join a voluntary Society, although quite as well qualified as his neighbour. The Act was intended to introduce a prospective improvement, to ensure the better qualification of future Pharmaceutical Chemists, not to injure and supersede those who had already a vested interest in the business.

As a proof that this was the intention of the Act, all the existing Members, most of whom had not been examined, were specially entitled to registration as well as future Members of the trade who should have passed the examination. But this did not exclude those who had for many years conducted their business in a proper manner, and who, according to the learned Counsel on the other side, would be obliged to come to London from Newcastle, or Pensance, or wherever they happened to be in business, to pass the examination, or in default would be branded with incompetence by the establishment of competitors, under the name of Pharmaceutical Chemists, which was held to be an indication of superior qualification. There was no provision in the Act prohibiting the election of such persons as Members, and the learned Counsel, Sir F. Kelly, had not disputed the right of these parties to membership, although he had not admitted it. If, however, this right existed, which he (Mr. Bramwell) maintained to be the case, then the argument of his learned friend was one of the most frivolous which was ever brought before that Court. By the twelfth clause of the Act it was declared that any person not being registered as a Pharmaceutical Chemist should be liable to a penalty for assuming that title, or pretending to be a Member of the Pharmaceutical Society; and it would follow from the hypothesis that a person being a Member could not legally pretend to be one. It was needless to dwell upon this supposition, which could only be compared to an argument respecting the difference between tweedledum and tweedledee. Mr. Bramwell proceeded to explain another ground upon which the case before the Court must break down if dealt with on its merits. The Legislature having approved of the efforts made by the Pharmaceutical Society to introduce an improvement in the qualification of the class of persons for and by whom it was established, had entrusted that Society with the power of carrying out the provisions of the Act. The Society and the Council who conducted its affairs were the parties most capable of judging as to the qualifications of those whom they admitted on the list of Members, or on the register of Pharmaceutical Chemists; and as they had established the Society for the good and important purpose of introducing that improvement which the welfare of the public required, it was not to be supposed that they would so far deviate from the course which they had disinterestedly undertaken as to elect persons and place their names on the register without taking proper precaution to ascertain whether they were duly qualified. This precaution they had taken, and had required a certificate of qualification on behalf of every person so admitted. But even if they had in any case neglected this duty, the learned Counsel maintained that the Court had no jurisdiction or power of interference, as the Act had vested in the Society a discretionary power to manage its own affairs and to make bye-laws, subject only to the confirmation of the Secretary of State. On another ground this mandamus could not be sustained. The Registrar was a ministerial officer. He was the servant of the Council, and could only place on the register the names officially furnished to him. He had under the instructions of the Council registered certain names, and in doing so he had simply done his duty. He could only act upon instructions and information furnished to him, and even if such instructions were improper he was not the party responsible. The Registrar had not only done all that the Act required, but even more. The Act only required *in direct terms* that one register should be kept, but the Registrar had kept three. First, the register of the Members of the Society; second, the register of Pharmaceutical Chemists, including the original Members, the new Members, and persons who had been examined but had not become Members. Then there was a third register, containing only the names of those who had passed the examination. Consequently the public had every facility for obtaining information on the facts in which their interest was concerned, and the danger that had been enlarged upon by his learned friend respecting the supposed case of John Tomkins of Exeter was altogether

imaginary. The learned Counsel therefore maintained that, on the broad principle of justice; on the facts, that the Act contained no prohibitory provision—that the Council were invested with a discretionary power which they had exercised with due caution—that the Registrar (against whom these proceedings had been instituted) was only a ministerial officer—and that he had faithfully performed his duty—the case before the Court ought to be dismissed as frivolous, and the mandamus ought to be quashed.

Sir Fitzroy Kelly replied at great length, recapitulating his former arguments, and repeating the terms and provisions of the Act in support of his view of the case. In answer to the argument about an *ex post facto* law, he said the admission of the existing Members to the register of Pharmaceutical Chemists removed that objection. With regard to others who had not thought proper to join the Society, they had no right to complain. They could continue to conduct their business as before, under the name of Chemists and Druggists; but if they desired to assume the new name of Pharmaceutical Chemists they had the means of doing so by passing the examination.

The learned Counsel enlivened his argument by a variety of hypothetical suppositions, among which was the question, supposing the Council of the Pharmaceutical Society were to elect himself and his learned friend as Members, would they be authorized to place their names on the register of Pharmaceutical Chemists? In the course of the argument the learned judges occasionally interposed searching and appropriate questions, showing that they were not misled by any plausible statement on either side, and that they were endeavouring to sift the question at issue as fully as the facts before them enabled them to do so, for the purpose of arriving at a just and impartial decision.

This decision has not yet been given.

The patient endurance of the Court in listening to the dull dry pleadings, totally destitute of interest except to the parties concerned, was very remarkable. No less remarkable was the shrewd cleverness of Sir Fitzroy Kelly, who, in the course of his speech continually reminded us of the expedient resorted to by the countryman for selling a blind mare. Whenever the intended purchaser, in the course of his examination, began to look at her eyes, the vendor pointed to her hocks, and said, "My wife thinks she is spavined." This diverted the attention of the purchaser from the only weak point, which ultimately escaped detection, and the man sold his blind mare. In like manner did Sir Fitzroy Kelly incessantly reiterate his favourite points to divert attention from those which, if they had been made equally prominent, would have given a very different complexion to the case. Mr. Bramwell demonstrated the fallacy of the leading arguments of his opponent, showing that the Pharmacy Act, by unavoidable implication, if not by positive enactment, was in effect a *prospective* and not an *ex post facto* law; but he failed to give full emphasis to some rather important points, which furnish a clear and categorical refutation of Sir F. Kelly's hypothesis.

The points to which we desire to draw attention are these:—*First*, in reference to the statement of Sir F. Kelly, that the Act provides no means of admission to membership except by previous examination and registration as a Pharmaceutical Chemist, it should be specially observed that the second section *confirms* for a stated period *the then existing bye-laws* under which the Council had power to elect certain persons as Members *without examination*, on production of satisfactory certificates. The legality of the election of William Murdoch and about 300 other Members, is seen at once by reference to the *third paragraph* of the *first section of the bye-laws of* 1851 under which they were elected, and the *second section of the Act*, which enacts that those bye-laws shall continue in force until the next annual meeting in May, 1853.—*Secondly*, The new bye-laws in dispute are in effect the same as the above, except that they are more stringent in regard to the certificate of qualification, and the *date of the Act* is

substituted for the *date of the Charter.*—*Thirdly*, These bye-laws were passed for a temporary purpose, and were in strict conformity with the principles laid down in the charter, which respected vested rights; being applicable only to those persons who *prior to the date of the Act* were actually Pharmaceutical Chemists, and had a legal right to assume that title.—*Fourthly*, It is a mistake to say that Pharmaceutical Chemists are a new class called into existence by the Act of Parliament. All Chemists and Druggists were Pharmaceutical Chemists before that time, and the Act only gave a new import to the term, but could not justly deprive of the right of assuming it, those who already enjoyed that right, provided they were willing on the passing of the Act to comply with the conditions on which the distinction had been conferred on their compeers in business. —*Fifthly*, Sir Fitzroy Kelly, in denouncing the register of Pharmaceutical Chemists, which he calls *mischievous* on account of the addition of the names of the new Members, omitted to analyze the register as it would have stood according to his own version of the Act, comprising, first, all the Members at the date of the Act — secondly, the persons duly examined after the passing of the Act. Of the former, more than 1500 (having been original Members) have not been examined, and the total number examined did not amount to 300. Consequently, according to Sir F. Kelly's method of laying down the law, neither he nor his family would have been safe in the hypothetical case of John Tomkins, of Exeter, who, although on the undisputed register, might have been one of the 1500 who, according to the statement of Sir F. Kelly, ought not to be trusted with a prescription.—*Sixthly*, The new Members are quite as qualified as the Members who are ordered by the sixth section of the Act to be registered as Pharmaceutical Chemists. Their only disqualification (if any) consists in the circumstance, that they did not think proper to join the voluntary Society until the Act was obtained.—*Seventhly*, Scarcely any allusion was made in the argument on either side to the terms in which the Council are empowered to make "such bye-laws *as they shall deem proper and necessary* for the purposes contemplated by the said Charter or by this Act," subject only to certain prescribed confirmation. We are told that this question is foreign to the points of law on which the case hinges, yet it is difficult to reconcile the plain meaning of the words of the section with the supposition that they did not give the power to make regulations which can be shown to be essential for the purposes contemplated by the Charter and by the Act.

But the most extraordinary feature in the case is this:—Until the year 1852 the Legislature turned a deaf ear to every appeal on behalf of the Pharmaceutical body for improved education and a system of examination. It was with great difficulty that the subject was forced upon the attention of the House. Petition after petition was thrown under the table. Bill after Bill was drawn, and not a Member could be found willing to introduce it. At length, by the persevering efforts of the Society during nearly eleven years, the ear of the House was obtained. The Bill was brought in, referred to a select Committee, and cut down to a mere shadow, a recognition of a voluntary Society. Such as it was it was pushed forward against the stream. Night after night it was put off among the so-called "unimportant measures." It was only on the last day of the session that it became law, and the Council, although disappointed at the curtailment of the powers for which they had applied, to compel all future dispensers of medicine to undergo an examination for the safety of the public, endeavoured to turn to the best account the Act of Parliament such as it was. The only means by which they could effect this object consisted in extending the basis of the Society as they have done, and thus enlarging the sphere of its influence. The Act gave them no power to compel any person to come up for examination. They had no right or reason to expect that those who were in business on their own account before the passing of the Act would

voluntarily submit to that condition. But they had good reason for believing that if they respected vested rights, and admitted those who were actually Pharmaceutical Chemists before the date of the Act, on the terms and conditions on which they had themselves been admitted in conformity with the provisions of the Charter, then, in that case, all, or nearly all the Assistants and Apprentices of the persons so admitted would qualify themselves, and pass the examination, for the purpose of acquiring the same *status* as their employers. It was in this manner that the Council hoped and endeavoured to bring the Act into general and speedy operation. In the midst of these exertions they are met by a hostile attack. Sir Fitzroy Kelly rises up in judgment against the Society, and disputes the right of the Council to exercise the discretionary power vested in them by the Act in the only way which, in their opinion, is likely to bring its provisions into speedy and extensive operation, the denial of that right being founded, not on any positive prohibition (for the Act contains none) but on the absence of a specific direction on a matter of detail which was advisedly left to be regulated by the bye-laws.

What a mighty and sudden revolution must have taken place in the requirements of the public, if we are to be led away by the pathetic appeal of Sir Fitzroy Kelly on behalf of himself and his family on their arrival at Exeter! Until the 30th of June, 1852, the Legislature had not thought it worth while even to recognize the propriety of an examination for Pharmaceutical Chemists, and then it was only sanctioned as a voluntary proceeding. On the 22nd of November, 1854, *before the Act has had time to produce its effect*, Sir F. Kelly describes in glowing terms to the Court of Queen's Bench the dreadful consequences of allowing a person who has not been examined to prepare a prescription! Is it to be supposed that several thousand Chemists, who were established in business before the date of the Act, will come up to pass a voluntary examination? or that a supply of examined Chemists is to rise up by magic within a few months of the passing of a permissive Act of Parliament? It would be vain to expect a sudden revolution in such a case, and it is most unjust to brand with the stigma of incompetence a numerous and respectable body of men who are endeavouring to benefit the public by the introduction of an improved system of education, by means of which the character and usefulness of their profession will be advanced, and a superior class of men raised up as their successors. Time and perseverance can alone effect the desired change, and we cannot but regret to see the talent of so eminent a lawyer as Sir Fitzroy Kelly misapplied in the endeavour to obstruct and retard a reform so important to the welfare of the public.

PROSECUTIONS UNDER THE APOTHECARIES' ACT OF 1815.

We purposely abstained in our last number from any comments on the trial of "The Apothecaries' Company *versus* Brownridge," a report of which we now give, page 285. Having understood that application was about to be made for a new trial, we thought it would be premature under these circumstances to discuss the merits of the question at issue until after the decision of the Court with regard to this application.

The result has been as we anticipated, a refusal of the application for a new trial, and the verdict against the defendant is therefore confirmed.

As the question involved in this case is interesting to Chemists generally, and as it is likely to be misunderstood unless the facts are clearly stated, we think it right to point out to what extent (if at all) the late decision affects the interests of the Pharmaceutical body.

The exciting cause of the union of Chemists and Druggists in 1841, and of

the partial union on several previous occasions, was the attempt on the part of some members of the medical profession to introduce restrictions against persons prescribing and practising as Apothecaries, without possessing a licence under the Apothecaries' Act. These proposed restrictions were so framed as to interfere with the customary business of a Chemist and Druggist, making him liable to a penalty for recommending or administering a dose of medicine either in his shop or elsewhere. It was not difficult to demonstrate the practical injustice and impropriety of these proposed stringent restrictions, but it was rather difficult to draw the line between the proper and customary privileges of Chemists and Druggists according to the interpretation of the clause exempting them from the operation of the Apothecaries' Act, and the irregular practice which constituted an infringement of the Act, and might be dealt with as an abuse of the privilege.

It was contended on behalf of the Chemists that it was a part of their duty to be acquainted with the properties and doses of medicines, and to give such information to their customers as might be required with regard to their use. The public being in the habit of taking medicines in many cases without medical advice, it was held to be important for the public safety that the persons furnishing such medicines should have a right to give the needful instructions as to the dose, with such precautions as might be desirable, and should also be empowered to administer a dose of medicine in case of slight ailment. It was proved that this was the regular custom of the trade before the passing of the Apothecaries' Act in 1815. On the other side it was contended that a person not acquainted with the science of medicine (including anatomy, surgery, &c.) could not distinguish between a trifling ailment and one requiring urgent measures and skilful treatment, and that mischief might be done not only by the administration of improper medicines, but by delaying the application to a qualified practitioner, who would have prescribed the remedies the case required. It was therefore difficult to draw the line, and the only mode of meeting the difficulty consisted in making a distinction between what is called "Counter Practice" and the practice of a visiting Apothecary or Surgeon. This distinction, although the best (if not the only one) that could be devised, is not infallible, as a patient, who *ought* not to leave his bed, *may* imprudently go out and apply to a Chemist for medicine. The Chemist may fail to recognize the severity of the symptoms and give the wrong medicine, or omit to give the right, which amounts to the same thing. On the other side a Chemist may be sent for on an emergency, when no medical man is at hand, to administer an antidote in a case of poisoning, for example, and in so doing he may transgress the letter of the law, while he is merely performing an act of humanity.

These, however, are exceptional cases, and do not invalidate the practical application of the general rule, which may be expressed as follows. If a person be well enough to go out and call on a Chemist, there is no evidence to show that he requires medical advice. He may prescribe for himself, or if he think proper he may ask the opinion of the person from whom he obtains the medicine. But if a patient be too ill to leave his house, he is, upon that hypothesis, ill enough to require medical attendance, and the Chemist who visits such patient, prescribes, and administers the medicine, takes upon himself the responsibility of practising as an Apothecary, and is liable to the consequences.

Applying the test of this general rule to the case before us, we find one of the witnesses, Mrs. Ann Rutherford, states as follows: "She took the child, on the 13th of February, to the defendant in Mill Street. He gave her some medicine for him. She took him on several occasions, but he got worse. The defendant said the child had a complaint that was prevalent, and that he was very ill, and he would look in and see him when he was passing. He called twice. The child died on the 20th of February." Defendant gave a certificate for the registrar, stating the cause of death to be inflammation of the lungs.

Another witness, Tamar Gould, states: "One of the children had been ailing for some time, and when too ill to be taken to the defendant he came to the house once or twice. After her confinement with the other child, in August twelvemonths, she took it in blankets to the defendant." The Counsel for the prosecution said there were eight or nine cases precisely similar to the above.

A shop-bill was also produced, which had been printed for and issued by the defendant, in which he makes allusion to "the numerous patients applying to him for advice." No doubt, therefore, could exist as to the fact, that the defendant was carrying on an extensive practice as a visiting Apothecary.

We have been informed through another channel (although it does not appear in the report of the trial) that defendant was an Assistant to a medical practitioner before he commenced business on his own account, and that while in that situation he was initiated in the practice of attending patients. Instead of completing his medical education he commenced business as a Chemist and Druggist, trusting to the exemption contained in the 28th section of the Act, which reserves to Chemists and Druggists the right to carry on their business, to all intents and purposes, as the same business was carried on before the passing of the Act. His defence rested on this exemption, and one witness went so far as to say, that he was in business before 1815, and that Chemists and Druggists did at that time not only prescribe but visit patients. It was moreover alleged, that as the defendant did not charge for medical attendance, but merely for the medicine, he was practising as a Chemist and Druggist, and not as an Apothecary.

If this were to be received as the correct interpretation of the Apothecaries' Act of 1815, any "half-fledged Apothecary," having acquired a smattering of medical knowledge during his apprenticeship, and not finding it convenient to complete his education, might evade the law by assuming the name of a Chemist and Druggist, and at the same time acting to all intents and purposes as a visiting Apothecary.

It was formerly the general custom of Apothecaries, and is still to some extent, to send in "long bills for medicine," without any allusion to medical attendance, although the amount charged is understood to include all that is due for professional services. In the case of the Apothecaries' Company *v.* Greenough, which was noticed in this Journal, vol. i., page 176, the defendant designated himself as a Surgeon, and charged for attendance. He boasted of having upwards of 300 patients, and yet, when prosecuted by the Apothecaries' Company, he hoisted the colours of a Chemist and Druggist, and sought refuge in the exemption clause above mentioned. The defence, however, was an entire failure, and several cases have subsequently occurred in which unqualified practitioners have resorted to the same expedient to no purpose, it having appeared that they had assumed the name of Chemist and Druggist for no other purpose than to evade the Apothecaries' Act.

This attempt to sail into medical practice under pharmaceutical colours, should be discountenanced as an abuse of privilege, calculated to bring discredit on the Pharmaceutical body. Hitherto the Chemists have successfully resisted the threatened encroachments on their rights and privileges, because their claims have been founded on justice and common sense; but if they were to act upon the supposition that the exemption in their favour in the Act of 1815 breaks down the barrier and invests them with the privileges and status of "visiting Surgeons and Apothecaries," they would thereby afford a pretext for the introduction of a more stringent law, which might be found injurious and inconvenient.

We, therefore, consider the decision in the case of The Apothecaries' Company *versus* Brownridge, favourable to the interests of the Pharmaceutical body, as it proves that the existing law is operative against unqualified medical practitioners, who merely assume the name of Chemist and Druggist as a sub-

terfuge, while it reserves to the Chemist and Druggist or Pharmaceutical Chemist all the legitimate functions belonging to his business. Up to the present time no conviction has been obtained against a Chemist for recommending or administering a dose of medicine across the counter, and we believe that in all the cases in which penalties have been inflicted, the defendants have been in fact not Chemists and Druggists, but unqualified medical men in disguise.

THE RESPONSIBILITY OF DISPENSERS OF MEDICINE.

The case of Read *v.* Sweatnam (reported in the *Times* of November 6th) is a curious illustration of the uncertainty of the law in cases of divided responsibility. The plaintiff, Mr. Read, of Islington, had consulted the defendant, Mr. Sweatnam, respecting some slight ailment with which he was affected. His wife at the same time had consulted Mr. Sweatnam about her child, an infant of three weeks old, who had a sore on the back. It being about ten o'clock in the evening, Mr. Sweatnam said it was too late to send the medicine from his own house, and on his proposing to obtain it from a Chemist and Druggist close at hand, the wife of the plaintiff directed him to a shop "at the bottom of the street on the left." He called at the shop, and wrote a prescription for Mr. Read—namely, a mixture and a powder. On the same paper, but with a line drawn across, and the word "Infant" written above it, he wrote a formula for a lotion. The Chemist omitted to write the names on the medicine, and enclosed the powder in the same parcel with the lotion. None of the family recollected a powder having been mentioned by the doctor, but seeing it enclosed with the lotion, which they knew was for the infant, they gave the infant the powder also. In the morning Mr. Sweatnam called to see his patients, and found the child in a comatose state. On hearing that the powder had been given, he exclaimed, "Good God, what powder?—You know I never ordered a powder!" (The powder consisted of ten grains of Dover's powder.) The child died in the course of the day, and the father consulted his lawyers with a view of recovering compensation for the loss. The amount was estimated as follows:—The funeral, £3 14*s.*; loss of time, £4; family mourning, £14; doctor's fee, £1 10*s.*, &c. The solicitors urged defendant to bring an action against the druggist, which he declined; they then endeavoured to persuade him to allow judgment to go by default, and then proceed against the druggist. This he also declined. The action, therefore, was brought against Mr. Sweatnam on the plea that he was the party who furnished the medicine, and that the druggist was his agent. No blame whatever was imputed to Mr. Sweatnam; his instructions respecting the medicine were explicit, and the person who prepared the prescription read it aloud to him, proving that he understood it.

The jury returned a verdict for the plaintiff, damages £6 14*s.*, with £8 for the mourning. The latter sum was disallowed by the judge, who entered the verdict for £6 14*s.*

It is rather difficult to understand on what principle of justice this verdict was founded. The plaintiff had sustained an injury (the loss of his child). It was alleged that this was the result of culpable negligence, and it would appear just that the person injured should receive compensation from the person by whose culpable negligence the injury had been caused. The defendant had omitted no precaution which any reasonable person could require. Although he wrote formulæ for two patients on one piece of paper (a practice which it would be well to avoid), he guarded against mistake by distinctly writing the names and drawing a line across the paper, nor did he leave the shop until he had heard the druggist read the prescription aloud to satisfy him that he perfectly understood it. Having observed this scrupulous care he retired to rest in the full persuasion that he had done his duty. The culpable negligence (if any)

was not on his part, but rests between the druggist who omitted to write the names on the medicine, and who enclosed the child's lotion in the same parcel with the plaintiff's powder, and the mother and grandmother who administered the powder, although they had neither been told verbally by the doctor, nor in writing by the druggist, that the powder was for the child.

It was alleged that the druggist was not responsible to the plaintiff because he had received his instructions from the defendant and on his behalf; but the plaintiff's wife had mentioned the druggist by name to the defendant, and directed him where to find the shop. The druggist was, therefore, quite as much the agent of the plaintiff as of the defendant, who merely went where he was directed. Moreover, it came out in evidence that the plaintiff's wife and her mother had some hesitation and discussion respecting the powder, being in doubt whether it was intended for the child or not; and instead of giving the child the benefit of the doubt, they administered the powder.

Of the four parties concerned in the unfortunate transaction, namely, the defendant, the druggist, the mother, and the grandmother of the child, only one was perfectly free from blame, namely, the one against whom the action was brought. The druggist was guilty of an omission in not writing the names of the patients on the medicine, but the mother and grandmother took upon themselves the responsibility of giving the powder to the child, although in doubt whether they were doing right or not, and when they might have cleared up the doubt in five minutes by sending round the corner to ask the question. Under these circumstances it is surprising that the father of the child should have brought such a case into Court, and it is still more surprising that a jury should have found a verdict against the only one of the parties concerned who was not in any way culpable. We may deduce from the case the following precautions, which was our object in noticing it.

First, In prescribing, it is not a good plan to write prescriptions for more than one patient on the same paper.

Secondly, In dispensing (as well as in prescribing) it is of the greatest importance to be accurate and explicit in the names of patients, especially when two or more in the same house are taking medicine.

Thirdly, Medicine should never be taken or administered without carefully reading the directions on the label, and whenever any doubt exists, inquiry should be made before the medicine is used.

We may also observe that medical men who habitually employ Chemists to dispense their medicines and charge the same to their patients in accounts for "attendance including medicine," are responsible for any mistake or accident on the part of the persons so employed to dispense for them, and are also liable to a penalty under the Apothecaries' Act, unless they are licensed to practise as Apothecaries. In such cases, the Chemist is the *bonâ fide* agent or assistant of the medical practitioner, and the liabilities are the same, whether the dispenser lives in the same house or in a neighbouring street.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

Wednesday, November 1st, 1854.

Donations to the Library and Museum were announced as follows:—

The Chemist, from Mr. Highley.
The Journal of the Institute of Actuaries, from the Institute of Actuaries.
Journals of the Photographic Society, from the Photographic Society.
Journals of the Society of Arts, from the Society of Arts.
The Literary Gazette, from the Publishers.
Two specimens of Sarsaparilla, from Dr. Rhys, of Belize.
Specimen of a root, imported as Rhatany Root, from Mr. A. Faber.
A large branch of *Ráphia vinefera*, with fruit, from Mr. E. Guiot, of Port Louis, Mauritius.

Mr. Daniel Hanbury remarked, with reference to the root presented by Mr. Faber, that it had been imported in considerable quantity from South America. It was not considered to be true rhatany, although it resembled it in some respects. The bark was thicker and smoother, and the colour less red, than true rhatany. It had been described by Professor Mettenheimer, of Giessen, as *spurious Rhatany root.*

Mr. Morson said he had compared the root with true rhatany, and observed but little difference except in the colour.

The following papers were read:—

DESCRIPTION OF THE BUNGO, OR FRANKINCENSE TREE OF SIERRA LEONE,

Regarded as a New Genus of Cæsalpineæ.

BY JOHN J. BENNETT, F.R.S., SEC. L.S., &c.

It is singular that so remarkable a genus of plants, growing in the immediate vicinity of Sierra Leone, and furnishing so valuable a product, should have remained up to this time entirely undescribed—but I can find no trace of it in any published work; although I entertain no doubt that a specimen (bearing leaves only, accompanied by a few flowers) collected by Afzelius, and preserved in the Banksian herbarium at the British Museum, belongs to the same genus, even if it be not (as I conceive it to be) specifically identical with Dr. Daniell's specimens. This specimen is marked "*Papilionacea gummifera*," but has certainly no claim to the former of these designations. The specimens brought home by Dr. Daniell are without flower, but are accompanied by good examples of the ripe fruit, and supply the materials for the first part of the following description:—

Folia alterna, abruptè pinnata; petiolo communi 8-10-pollicari, teretiusculo, basi incrassato, glabro, definito (apiculo scilicet ultra par foliolorum ultimum nullo); foliolis oppositis, 8-14, petiolulis brevibus glanduloso-incrassatis insistentibus, ovato-ellipticis, basi inæquali obtusis, apice abruptè acuminatis, 3-6 pollices longis, 1-2 latis, glaberrimis, lucidis, venis crebris venulisque creberrimis anostomosantibus subtùs præsertim conspicuis, copiosè pellucido-punctatis. Stipulæ (e cicatricibus tantùm relictis) verosimiliter magnæ; stipellulæ nullæ. Flores desunt. Panicula? pauciflora. Pedicelli cum calycis tubis persistentibus lignoso-incrassati, apice cicatricibus bractearum duarum notati; leguminis stipite incrassatâ cum basi calycis tubi (posticè altiùs) cohærente, parte solutâ semipollicari. Legumen compressum, subcoriaceum, dehiscens, glaberrimum,

pollices 2 et ultrà longum, 1 latum, obliquè ovatum, suturâ superiore marginatâ rotundatâ inferiore supernè rectiusculâ; endocarpio pergameneo, glaberrimo, in maturitate secedente. Semen unicum perfectum ex apice ferè cavitatis pendulum (ovulis reliquis 8-10 vix auctis persistentibus) 8-9 lineas longum, 4-5 latum, complanatum, ellipticum; funiculo brevi spongioso flexuoso in arillum vel carunculam imam seminis basin tantùm fulcientem desinente. Testa glaberrima, fusco-castanea; raphe marginali; cotyledonibus amplis, planis, cartilagineis, profundè cordatis lobis contiguis; radiculâ in extremitate seminis superiore rectâ, in cotyledonum fissurâ profundè immersâ.

In the Banksian specimen from Afzelius, the branch is terminated by what appear to be several involuted stipules of more than an inch and a half in length, and bearing a distant resemblance to the sheathing stipules of figs, *Artocarpeæ*, &c. The leaves agree in every thing with those above described, except that the leaflets are slightly narrower in proportion to their length, and their acumen is less abruptly given off; but the leaflets of Dr. Daniell's older specimens show a close approximation to the same form.* Of the flowers, one is partially opened, and the others are unopened buds, of which the following (as far as the examination of two of the unopened buds will admit) is a description:—

Florum pedicelli glabri, supernè bibracteati; bracteis etiam in alabastro caducis et cicatricibus tantum obvïs. Alabastrum ovali-oblongum, subsericeum. Calycis tubus obconicus; limbus 4-partitus, lacinïs cucullato-obovatis, crassis, coriaceis. Petala (3 v. 4) fauci calycis tubi inserta, cucullato-obovata, paulùm inæqualia, intùs marginibusque sericeo-tomentosa. Stamina 10; filamentis cum tubo calycis intùs densè sericeo et paulò altiùs inter se (posteriore excepto) cohærentibus, basi sericeo-tormentosis, supernè glabris, in alabastro medio inflexis, alternis longioribus, unde antheræ deflexæ et in seriebus duabus positæ. Antheræ medio dorso affixæ, ovali-oblongæ, omnes æquales fertiles. Ovarium glabrum (sicut et calyx et corolla), punctis crebris obsitum, stipitatum, stipite basi cum calycis tubo posticè cohærente, inæqualiter oblongo-subquadratum, pluri-(10-12) ovulatum. Stylus longiusculus, in alabastro spiraliter tortus, in stigma paulò incrassatum desinens.

From the foregoing description it is sufficiently evident that the plant belongs to the family of *Cæsalpineæ*, and to that remarkable tribe to which I formerly called attention in "*Plantæ Javanicæ Rariores*," p. 145 and p. 161, "characterized by their abruptly pinnated leaves, the two conspicuous bracteæ enveloping the base of their calyx, and the adhesion of the stipes of their pod posteriorly to its persistent tubular base," to which Mr. Bentham has given the name of *Amherstieæ*. If (as I see no reason to doubt) the specimens in flower and fruit belong to the same plant, the characters will be as follows:

Fam. CÆSALPINEÆ. *Trib.* AMHERSTIEÆ.

Gen. DANIELLIA.

CHAR. GEN.—*Calyx* basi tubulosus bibracteatus, bracteolis ante anthesin caducis; limbo 4-partito. *Petala* (3 v. 4) sessilia, subæqualia, calyce vix longiora. *Stamina* 10; *antheræ* omnes æquales fertiles. *Ovarium* stipitatum, 10-12-ovulatum; *stylus* filiformis. *Legumen* subcoriaceum, dehiscens; *endocarpio* pergameneo secedente. *Semen* unicum maturescens (ovulis reliquis vix auctis persistentibus), complanatum, basi arillo brevissimo suffultum.—Arbor Africæ Tropicæ Occidentalis; folïs *abruptè pinnatis*, *plurijugis*; stipulis *magnis*; paniculâ (?) *pauciflora*.

* I have since seen at the Linnean Society, among the undetermined plants received by Sir James Edward Smith from Smeathman, from Sierra Leone, a specimen also in leaf only, labelled "a fine perfuming gum." In this specimen the leaflets are rather of a thicker texture, and the dots consequently less pellucid, and there is a decided difference of colour between their upper and under surface; but in all other respects they are identical.

Daniellia Thurifera.

Hab. prope Sierra Leone, resinam fragrantem *Bungo s. Bungbo* dictam exsudans.

The African genera to which *Daniellia* approaches most nearly are *Afzelia*, *Berlinia*, *Anthonota* and *Intsia*, from which it differs essentially by the want of the long unguiculate vexillum, which is common to them all; by the somewhat coriaceous dehiscent pod, entirely destitute of pulp within, and of which the smooth endocarp separates at complete maturity; and by the abortion of all the ovules save one. The ripe fruit of *Berlinia* is still unknown, but it probably differs little from that of *Afzelia;* and the floral characters alone are quite sufficient to distinguish it from *Daniellia*.

ON THE STRUCTURE OF THE STARCH GRANULE.

BY MR. JAMES JOHN FIELD.

The physical characters exhibited by the lowest forms of animal organisms appear so closely allied to those found in certain plants, that it is still an unanswered question, how those forms may be correctly referred to the kingdom of which they really form members.

In less equivocal cases *general* distinctions are had recourse to, but such distinctions are inapplicable to the forms of which I now speak, and therefore is it that the necessity for some *specific* distinction has become recognised.

But although many investigators have devoted attention to this subject, no one seems yet to have indicated any peculiarity of structure in either the animal or vegetable kingdoms, which may be available as a *positive line of demarcation* between them. For the solution of this problem we must doubtless rely upon the advancing powers of the microscope, which are daily making us better acquainted with the proximate elements of organic structures; and from this consideration every microscopic observation tending to elucidate the nature of these elements should be recorded.

It is under this impression that I make the following observations upon the structure of the starch granule, for notwithstanding that the subject has been already ably treated by various writers, some maintaining its membraneous, and others its non-membraneous character, the question does not seem hitherto to have been so absolutely decided as to render additional evidence unnecessary.

By availing myself of the peculiar organic property of endosmose, I have obtained what I believe to be the most complete and demonstrative evidence of the existence of a membrane around the starch granule; and I believe it will be generally admitted, that the action I am about to describe can only be accounted for on the premise that such membrane really exists.

I took a small quantity of the starch of Canna edulis, and having completely saturated it with pure glycerene on a glass slide, I covered it with a disc of thin microscopic glass.

It occurred to me, that if the granules were surrounded by a membrane, and the glycerine allowed to penetrate to their contents, the subsequent addition of a little water, by diminishing the gravity of the external fluid, would call the principle of endosmose into play; that the fluid contents of each granule would increase in volume by endosmotic action, and therefore, that unless the surrounding membrane were very distensible it would be ruptured.

On examination by the microscope I found this to have been the case. The granules had split open, and bore on their external surfaces distinct evidence of a membrane that had been corrugated by release from unusual tension; the membrane around some of the granules being visible in distinct longitudinal wrinkles, from the hilum downwards.

Were the starch granules composed of superposed laminæ only, as some observers have maintained, it is not comprehensible why the addition of water, as before described, should rupture them; and even admitting the possibility of

this occurring, through some agency not understood, the conclusion is almost irresistible, that the rupture would then have been in the direction of the laminar surfaces, whereas, being from the hilum downwards, it was, of course, at right angles to those surfaces.

The fact of the fracture always occurring in the direction of the axis may be readily accounted for, by adopting the supposition that the concentric lines, observable upon the surface of the granules, are simply plications of the membrane, admitting thus of its extension from one extremity to the other, but not laterally. This would, of course, *necessitate* the fracture being, as I have observed, in the direction of the axis, and this view derives much support from the circumstance of the concentric lines having disappeared during the progress of the experiment.

From these observations then it would appear, that starch consists of granular matter, enclosed in a membraneous vesicle, of very sparing distensibility; and that the superficial markings are simply minute folds in the membrane, probably caused by some contraction that the granule undergoes in passing from the fresh state, as it exists in the plant, to the dry form.

2, *Southwood Terrace, Highgate.*

The Chairman said, that Mr. Field's experiments tended to confirm the views which had been entertained by other observers; such, for instance, as Mr. Geo. Busk, who in December, 1852, before the Microscopical Society, read a clever and interesting paper "On the Structure of the Starch Granule." His reasons carried great weight, one of the strongest arguments being founded on the action of heat and other agents which cause the granule to swell, and before bursting, the concentric lines were found to disappear; thus tending to prove that the lines are on the surface. Still he (Mr. Deane) had not been able to satisfy his mind that such views were altogether correct. He rather inclined to those of Schleiden and others, and more particularly those of the late Dr. Pereira, who, when preparing his last edition of the *Elements of Materia Medica*, devoted much time to this difficult question. Dr. Pereira considered the granule to consist of concentric layers, inclosed in a smooth, tough membrane or cell. The models on the table, designed by him, and made expressly to illustrate his lectures, would in some degree explain his views. Mr. Field considered the concentric markings to be external corrugations; and Mr. Busk and others, that these corrugations are on one side only. Now these markings were found to exist equally in starch fresh from the tuber as in that which had been dried, and therefore they could not be the effect of any shrinking by loss of moisture. In the case of Yam starch, which consists of flat grains, it would be observed on looking on its flat side, that the rings followed the broad outline, and on looking on the edge that they equally followed the narrow outline, results similar to what would be obtained on viewing in the same way a nest of flat glass shades. If a little Yam starch were placed in water between two pieces of glass under the microscope, most of the grains would appear on their flat sides, but some few would be on edge, or if not, they might be made to turn over, so as to show their edges, by giving a slight lateral movement to the covering glass, when they may be readily observed in every position. This peculiarity of marking, he thought, was not much like mere external corrugations, but more like the effect produced by superposed layers, and he believed it was this starch, so well adapted from its form to demonstrate the theory, that confirmed Dr. Pereira in the opinion he entertained. It did not follow that because there were concentric layers of matter there should be concentric membranes enveloping those layers, any more than that there should be a tough bark investing every annulation in an exogenous stem. That there was one general investing membrane or cell there was no difficulty in showing. If a little boiling water were poured on to starch, and it were then examined under the micro-

scope, an abundance of empty collapsed cells would be observed; and if this aqueous solution of starch were to be largely diluted with water they would all gradually fall to the bottom of the vessel.

So little was known of the mode of growth of the starch cellule that it was impossible to say at present how the increment takes place. It may be uniformly, or it may be periodic, the difference between night and day possibly being sufficient to account for the difference in density of the layers; that is to say, supposing the markings to indicate concentric layers—just as the seasons appear to affect the density of the annular rings in the stems of trees. With regard to the direction of the fissure on the bursting of the granule, longitudinally would be the natural direction in a body constituted of concentric layers; at least, it was very doubtful if the concentric layers would offer any impediment to such a mode of splitting. From what is observed in reference to exogenous stems, one would infer that there would be a greater facility for rupture in that direction. Wood splits readily in the direction of its axis—that is longitudinally, not at all transversely, or at right angles to it, and in many instances not readily in the direction of the annulations, or perpendicularly to the medullary lays, and in some of the coniferæ this tendency is extensively rendered available in the production of laths for ceiling and roofing purposes.

Having seen Mr. Field's paper before it was read, he had tried the experiment referred to in it, but the result had not satisfied him that the appearance observed was due to the rupture of the granules. He was rather disposed to refer it to a shrinking of the granule and consequent puckering of the enveloping membrane. His observations, however, had been somewhat hastily made, so that he could not give a decided opinion. He thought that a further investigation of the subject was required, and that many more observations must be made before either of the theories which had been propounded could be considered as established.

Mr. Giles said, as the Chairman seemed to differ from the author of the paper as to the cause of the appearance presented by starch granules when immersed in solution of glycerine, the latter describing the action as that of a swelling of the granule and a bursting of its envelope, while the former considered that a reverse action took place, he thought it desirable that some experiments should be made to determine the mode of action of aqueous solution of glycerine and of starch on membrane. If it should be found that, in accordance with the usual phenomena of endosmose and exosmose, a thin solution of glycerine permeated membrane more quickly than the thick gelatinous contents of the starch granule, this would afford a strong argument in favour of Mr. Field's opinion.

Dr. Edwards thought the question a very difficult one to decide, and therefore one upon which much difference of opinion would probably continue to exist. The Chairman appeared to meet Mr. Field half-way, for while the latter combated the notion that the markings in starch granules were due to the existence of a succession of layers or strata without any distinct covering or envelope, contending that there was an outer membrane which was permeated by a dilute solution of glycerine; the latter admitted the existence of the membrane, although denying the endosmotic action of solution of glycerine, and at the same time contended that the markings were due to concentric layers within. He had, himself, in submitting starches to microscopic examination, observed certain phenomena, some of which were in favour of one and some of the other of these views. Thus, dilute acetic acid, while it caused a swelling of the granules, rendered the markings more distinct. On the other hand, gelatine and most of the media employed for mounting microscopic objects, sooner or later, caused the entire disappearance of the markings. So much indeed was this the case that a good medium for mounting the starches so as to show the markings was still a desideratum.

Mr. Bentley said the structure of the starch granule had always been an

interesting subject, but it was more particularly so at the present time, when starch, or at least a substance almost identical with it, had been found in animal structures, and thus its presence could no longer be relied upon as an absolute distinctive character between an animal and a vegetable. With regard to the structure of the starch granule, he had always been a firm believer in Schleiden's views in all their essential points, and he had been strengthened in this belief by repeating the experiments of Mr. Busk and Dr. Allman. That the starch granule consisted of a series of hollow scales or shells placed over one another, appeared to him to be supported by the results of many experiments and observations. Thus, if the cells of the potato were examined when very young, the contained starch would be seen to consist chiefly of minute granules scattered amongst larger ones, whilst in the cells of old potatoes the two different sized granules were observed, but here the smaller granules were comparatively few in proportion to the larger. The smaller granules were nearly spherical in form, while the larger were ovate or more or less irregular in their outline; but it was observed that the inner zones of the larger granules were nearly spherical, corresponding in appearance with the small granules. From these facts it was inferred that the small granules became the nuclei of the larger, and that they were augmented in size by successive depositions of concentric layers from within outwards, the outer layers becoming gradually more irregular. The experiments of Dr. Allman tended to show, that if starch be left for several weeks in a dilute solution of iodine and then examined by the microscope, the appearance of concentric layers became more evident; and that on the addition of a drop of dilute sulphuric acid, the granules immediately began to swell, and when the swelling had ceased, the scales were found to be more or less separated from one another. It had also been found that when starch was heated on a metallic plate until it began to assume a brown colour, on examining the granules with the microscope the nuclei were observed to be enlarged and the striæ rendered more distinct, results which were ascribed to the action of vapour produced by the heat, within the cavities. Another experiment which had been tried consisted in mixing starch with gum-water, and after allowing the mass to dry, cutting it into very thin slices, when many of the granules were found to have been cut through, and on examining these sections with the microscope, especially after treating them with solution of iodine and dilute sulphuric acid, strong evidence of the existence of separate layers was obtained. By these and other experiments he thought it had been pretty clearly shown that the starch granule was composed of a series of hollow scales, and he believed with Schleiden and others, that these were deposited from within outwards. Another question, however, presented itself, namely, are the different layers in the granule of the same chemical composition, or of the same relative density? He considered that the layers varied in density, the inner layers being more aqueous and gelatinous than the outer, which appeared generally to be altogether of a tougher consistence. He thought the layers had all the same chemical composition in the larger and perfectly formed granules, but it might be doubted whether the small rudimentary granules did not consist of a transitional substance not identical with starch, but which would become starch.

THE PROCESSES AND PREPARATIONS OF THE PHARMACOPŒIA.

Mr. Jacob Bell prefaced a few remarks which he wished to make on another subject by observing that the questions which had been discussed that evening, and other questions relating to abstruse chemical or botanical subjects, were very interesting and useful, but the number of persons who could take a part in such discussions was comparatively small. He wished to introduce to the notice of the meeting a class of subjects which addressed themselves to all the Members of the Society, in fact to every one who was in the habit of attending those

meetings, he alluded to the preparations of the Pharmacopœia. The College of Physicians having now recognised the Pharmaceutical Society as a body competent to assist in the practical details of the Pharmacopœia, and a Committee of the Society having been appointed for that purpose, all the preparations in the Pharmacopœia, or likely to be introduced, would in turn come under consideration, and would afford materials for discussion at the Pharmaceutical meetings. The Society must now come forward and prove to the profession and the public that the Legislature and the College of Physicians had acted wisely in intrusting them with the powers conferred by the Pharmacy Act, and the responsibility implied in the recognition of their Pharmacopœia Committee. They could not stand still. They must either advance and do their duty, or relapse into the position of mere tradesmen, vendors of drugs the nature of which they did not pretend to understand. Pharmacy had ceased to be a mere trade. The future race of Pharmaceutical Chemists must of necessity be educated men, possessing a knowledge of the science of their profession. The present generation must not be inactive, for almost every day brought forth some novelty or improvement in their processes and preparations, and those who did not attend to what was passing around them would be left behind, and find themselves supplanted. The Pharmaceutical Meetings afforded the proper opportunity for giving and receiving information, for bringing forward, for the benefit of the public and for the credit of the Members of the Society, the result of their practical experience. When those meetings were first introduced it was a common remark among the Members that they were not accustomed to take a part in proceedings of that kind. This could not be said now. They had for about fourteen years been in the habit of discussing subjects relating to their profession. They could no longer shield themselves under the excuse that it was foreign to their regular occupation. Young men had come forward with the advantages of a scientific education, and the original Members had enjoyed facilities for extending their stock of knowledge. Those who did not feel competent to take part in the discussion would be the parties most benefitted by attending the meetings, as they would hear the result of the investigations of others, and would in course of time be able to report their own experience. The class of subjects about to come under discussion at these meetings ought to awaken the interest of all Pharmaceutical Chemists who naturally desire to transact their business according to the most improved principles, and by comparing notes on the various processes in the Pharmacopœia, more uniformity in the preparations would be the result; for example—extract of taraxacum made according to the old method by boiling down the decoction over an open fire was quite a different preparation from the extract now prepared by careful evaporation of the juice at a moderate heat. The liquor taraxaci, made by different Chemists, differed as much as pale sherry differed from London porter. The same remark applied to many other preparations of a similar nature. Another subject which would claim the attention of the Pharmacopœia Committee and of the evening meetings was, the concentrated infusions, in reference to which three questions suggested themselves. First, Is it justifiable to use concentrated infusions in dispensing prescriptions in which infusions are ordered? Secondly, If it be justifiable, in what manner should they be prepared? Thirdly, If that class of preparations be approved, would it be desirable to introduce formulæ for them into the Pharmacopœia to ensure uniformity in their composition? By way of a commencement this subject might be discussed at the next meeting, and he (Mr. Bell) hoped that a paper would be forthcoming by a Member who had given his attention to these preparations. He should not occupy more time on the present occasion, his object having been to direct the attention of the Members at large to the importance of the opportunity now afforded to the Society for introducing improvements in the officinal preparations by discussing them at the Pharmaceutical Meetings.

ON LIQUOR AND EXTRACTUM TARAXACI AND OTHER EXTRACTS AND EXPRESSED JUICES.

BY MR. R. W. GILES.

The few remarks which I have to offer are so hastily arranged that they ought to be prefaced by a longer apology, if it were not my belief that the Pharmaceutical meetings would be benefitted if more rashness was manifested by Members. These observations are rather designed to suggest a subject for consideration, than to describe the result of any sufficiently elaborated investigation.

At the present time, the first that has ever offered to the Pharmaceutical body an opportunity of sharing in the preparation of the Pharmacopœia by which their operations are to be guided, it seems particularly desirable that our views should be sufficiently comprehensive, that we should not commence our labours by a seriatim revision of preparations in an isolated condition, but rather with a consideration of the objects which the several classes of pharmaceutical preparations are intended to subserve. For example, it might be a subject for consideration whether the tinctures are not inconvenient from containing so large a proportion of alcohol to the medicine intended to be conveyed, as often to interdict their administration in efficient doses. This may not be the best illustration possible, but it will serve as an illustration of the propriety of considering first how tinctures are likely to be employed, and afterwards how any particular tincture will best be made.

The class of preparations to which I wish now to refer, are "*Extracts*," and I would propose it as a subject worthy of serious thought: "What is the object in view in the preparation of extracts."

This form of medicine is obviously intermediate between the crude drug and the alkaloid, resin, or what not, to which the efficacy of the drug is supposed to be due. In some cases, the active principle is obscure, as in hyoscyamus, and the extract is a convenient approach to that which cannot be easily obtained. In other cases, as of nux vomica and aconite, the alkaloids are too deadly to be manipulated without anxiety, and the alcoholic extract is preferred as being more tractable.

It is clear, therefore, that the extract is sometimes preferred for its concentration, and sometimes for avoiding an ultimum concentration, and this diversity of object leaves some margin for the interpretation of the desideratum in extracts.

It is, however, worthy of consideration whether some modification of the present processes might not be advantageously suggested by keeping these objects in view. These reflections have been chiefly occasioned by some experiments with taraxacum juice. The curative value of this plant seems generally accepted, yet it is a singular fact that we have but one authoritative formula for its manipulation, which yields a very unsatisfactory result in the form of extract of taraxacum, which is now very rarely employed when the specific effects of the plant are desired; it is chiefly confined to the office of blending pills, with only a secondary importance attached to its presence.

Other preparations exist, so various as to occasion great perplexity to us, and not unfrequently to impress wandering customers with the suspicion of our inaccuracy, on account of the opposite appearances which one or another will cause in their medicines. They may, however, be considered in two classes:—the inspissated juices, introduced by Mr. Hooper, or the more fluid liquors, by Mr. Squire. I believe that grave objections apply to each, which I propose cursorily to observe upon. The inspissated juices contain an excessive proportion of inert quasi-starchy matter. The fluid liquors are largely impregnated with sugar.

In common with many others, I have found great caprice in the appearance of the expressed juice, and its behaviour during inspissation. Sometimes it has

appeared thick, and of a pale drab colour, and on standing for a short time (say half an hour) has become pulpy. In this condition it bears a very small degree of evaporation before it becomes so thick as to put a period to the process. The result is then of a drab colour, and agrees very closely with Mr. Hooper's preparation, becoming opalescent when diluted with water, resembling, as Mr. Hooper himself states, the milky juice of the root.

At other times the juice is darker in colour, very much more fluid, and nearly free from any of the quasi-starchy deposit. It bears a considerable diminution of volume without assuming the pulpy appearance, and ultimately becomes a muddy looking extract without passing through that state. It has also been my experience that juice originally possessing this character is prone to become sour during the evaporation, even when this is conducted with great care. These differences, which might be supposed to be due to the condition of the root at various seasons of the year, are not solely influenced by this cause, for I have found them exhibited in the operations of two consecutive days upon roots obtained from the same source; and I am inclined to believe that it is occasioned by the comparative length of time between gathering and pressing, even more than the period of year at which the collection of the roots takes place.

Further to elucidate the matter, some examination of the juice seemed necessary, the results of which I beg to submit:—

1st. A specimen of the drab-coloured puddly juice became clear by boiling, so far agreeing with the behaviour of starch.

2nd. When treated with iodine it gave no blue iodide of starch.

3rd. The iodine added in the last experiment was occupied so as to lose its action upon gelatinous starch subsequently added.

4th. When examined under the microscope there was no evidence of well defined starch grains, but abundance of irregular peculiar bodies without colour, but otherwise very much resembling the endochrome of ordinary parenchymatous cells. There were also diffused through it occasional groups of cylindrical cells placed end to end, some of the cells still full of these granular bodies, some empty, some ruptured and discharging their contents.

5th. The juice gave slight indications only of sugar when examined by Trömmer's test, even after inspissation, and would of course have been likely to have afforded still less before having been subjected to the action of heat, though this would probably vary according to the season.

6th. The endochromatous matter was found to be easily converted into sugar by boiling in the presence of SO_3.

Sufficient observations of the less turbid, darker juice, were not made, owing to the hasty manner in which the whole matter was attended to; but so far as they went they indicated a smaller presence of endochrome. This indeed is sufficiently expressed in the description of it as a juice wanting the *thickness* which distinguishes the other.

I believe the cause of this variation may be thus correctly explained:—

While the root is fresh, and before the cessation of vital action has produced a change in the juices, the cells containing the endochrome are more easily ruptured, and the endochrome itself is more perfectly suspended in the juices, and more freely yielded to expression.

It is also possible that a period of delay may allow a process of fermentation to be initiated, which may explain the greater disposition of the more fluid juice to become sour during evaporation at a moderate temperature.

The fluid "Liquors of Taraxacum," which I believe are generally made by a certain evaporation of the juice and addition of spirit, with subsequent filtration to separate the starchy matter, universally, so far as I know, abound in sugar.

We have now to consider the influence, in a pharmaceutical point of view, of the presence of this large proportion of endochrome in the one case, and of sugar in the other.

In the first place, I maintain that the endochrome gives rise to a very fallacious estimate of the preparation in which it occurs. We are prone to consider that the great aim is to achieve a *pale drab-coloured fluid*, which shall give a *milky mixture with water*, the first of these features being in fact an indication of the absence of any large proportion of that soluble matter which we assume to carry the medicinal property of the taraxacum, and the second, of the copious presence of inert matter.

In the case of the fluid liquors we find a portion of the endochrome has been converted into its other inert modification of glucose, and still contaminates the product, and this presence is generally held to be objectionable, but probably the greatest objection to this, as to the other, is, that they are not sufficiently concentrated to make the usually prescribed doses of any avail.

All that has been said of the two types of liquid taraxacum applies with increased force to the corresponding extracts—the ordinary P. L. extract, which is so notoriously contaminated with glucose, being represented by the liquor taraxaci, and that other form of opaque extract which has recently been proposed as its substitute agreeing with the inspissated juice—the sugar of the P. L. extract renders it objectionable, and the large proportion of endochrome present in the other dilutes it in a manner that militates against the intention of an extract.

The application of these observations is in determining the best means of getting in the form of a fluid or an extract, the largest amount of the active agency of taraxacum in the smallest volume, and I am inclined (though with insufficient experience) to think that two ways offer the means.

First, by allowing the roots to become somewhat flaccid by exposure, by which means I anticipate that less endochrome would be separable, and then to bruise and press them, sprinkling with water if found advantageous.

Second, To operate upon dry roots by cold maceration.

By neither of these processes could we obtain the pulpy-looking inspissated juice which we have learned to desire, but in my opinion this is no loss, as I have before stated my belief that this appearance is the measure in point of thickness of the inert matter present, and in point of colour of the small extent to which concentration has been carried.

We may further apply these considerations to extracts generally, and reflect whether we ought not to reduce their volume as much as possible, in order to make them fulfil their purpose, one part being of course the administration of an average dose in a pill, and whether it should not be our aim in the new P. L. to exclude inert matter, such as starch and albumen, from all of them. By these means the extracts even from drugs originally very different in quality would be assimilated, and one of the difficulties of adjusting their doses would be surmounted. A step in this direction was taken in the P. L. of 1851, by the substitution of cold maceration for boiling in several cases, due, I suspect, to the suggestions of Mr. Battley; but it is still a question whether much more does not yet remain to be done by similar means, and by the further employment of alcohol and ether as solvents. There will doubtless be a smaller product to the manipulator, just as one sovereign is of less volume than twenty shillings; but the possessor of the sovereign scarcely needs our sympathy, neither should we deserve consideration if narrow-minded notions led us in a direction opposite to the welfare of the sick—of which, however, there is no cause for apprehension.

Mr. Bentley said he thought the opinion of Dr. Christison on the subject of taraxacum was founded on fact and experience. Although the milky juice obtained in the autumn yielded a larger product, and was generally preferred, he believed the juice expressed in the spring, which was less milky and not so productive in the quantity of extract, possessed in a higher degree the medicinal properties of the plant. It was, however, difficult to arrive at a positive con-

clusion as to the effects of medicines of that nature, which are slow in their operation. An aperient or an emetic produced a sensible effect in a short time, but a medicine which required to be continued for weeks or months before the result could be obtained, was not so easily appreciated or its value ascertained.

Dr. Edwards thought the most uniform liquor taraxaci was that prepared by drying the root and macerating it with a definite quantity of water.

THE EARLY CLOSING MOVEMENT.

On the adjournment of the meeting being announced, Mr. Bell suggested that it would be desirable to consider the propriety of meeting half an hour earlier in future, as the hour from nine till ten was too short a time for the discussion of subjects of the kind which he hoped would be introduced, and as the early closing movement had produced some effect, he hoped it would be as easy to attend at half-past eight as it formerly was when the chair was taken at nine. If it should be the opinion of the meeting that it was desirable for the chair to be taken at half-past eight, the Committee which arranged the proceedings might adopt and announce the alteration in the time.

Mr. Waugh said, he was glad to hear the subject of early closing alluded to in that way by a Member of Council. He hoped he did so officially, and that it might be taken as an expression of the opinion of the Council in favour of the movement. He had rather regretted that the Council had not hitherto spoken out on the subject, and expressed some sympathy with the young men who are engaged for so many hours in their business, with a recommendation to the Members to promote a curtailment of these long hours so far as they might find it practicable. He thought it was due from the Council to the Members, that some official resolution or expression of opinion on a subject in which they were all so much interested should be published.

Mr. Bell said, he had not spoken in his official capacity, but as a Member of the Society. He might, however, state, that the subject had, on more than one occasion, been considered in the Council, and it was his intention at the next meeting to propose a specific resolution, similar in effect to that suggested by Mr. Waugh. He was, however, decidedly of opinion, that the Council had properly and advisedly delayed the official publication of any recommendation on the subject. He had always maintained that *example was better than precept.* Example had been tried, and had produced a good effect. Many Chemists had closed their shops at eight, instead of ten; and some had finally closed their doors at nine, instead of eleven. Others were following the example, and he hoped it would soon be generally adopted. The Council had always felt much delicacy in dictating or interfering in any way with the private business arrangements of the Members, which would have been likely to give offence, and thus defeat the object in view. But as it appeared that the disposition to promote the early closing movement was gaining ground, and as the chief motive for encouraging it was the desire to give young men more time for study and improvement, he thought the Council could do no less than express satisfaction and sympathy with the movement, and that the proper time had arrived for passing a specific resolution of the kind suggested.

PHYTOLOGICAL CLUB.

November 8th, 1854.

ROBERT BENTLEY, F.L.S., A.K.C., PRESIDENT, IN THE CHAIR.

Several Members were proposed for election, and communications were read from Edinburgh, Worcester, and Godalming. Donations of plants were announced from Messrs. Baxter, Tovey, Medley, Baylis, and Gissing, of Worcester; from Mr. Joy a collection of plants from Heidelberg; also another valuable donation of plants

from Dr. Melville through Mr. Deane; and a collection of Ergotized Grasses collected by Mr. Blyth, in the neighbourhood of Hastings; for all of which the thanks of the meeting were unanimously voted.

The following letter accompanying the box of dried plants was read from Mr. Gissing, the secretary to the Worcester branch of the Phytological Club:—

"We send 1000 specimens this time. It has been our chief object to send as many as we could that were not already in the Herbarium, and out of the 1000 specimens we send 86 *species* not marked in the catalogue of the Herbarium for last year. We hope next year to exert ourselves still further in furnishing plants for the completion of the central Herbarium, that being in our opinion a very important point in our organization. If possible we intend to make up another parcel before the conclusion of the session. Let it be the first object of our working Members to furnish the central Club with all the plants they possibly can that are not already there, and in two or three years we shall have a complete Herbarium of Reference."

Mr. Bentley then read a communication which had been forwarded to him by Mr. Head, of Falmouth,

ON THE POTATO DISEASE,

of which the following is an abstract:—

The writer stated that he had had great opportunities, from his former occupation of a farmer, for witnessing this disease in every point of its progress, from its earliest development to the most malignant stage. He stated that he had observed it as early as the month of May. It invariably made its appearance on the leaves of the lower branches of the most luxuriant plants in the form of one or more protuberances on their upper surfaces, attended by corresponding depressions on the lower, in which might be detected, as the disease progressed, various kinds of *fungi* and *animalculæ*.

The writer then enters upon the question, what is the cause of the disease? He argues against its being atmospheric, because, in every instance in which he had observed it, he found the leaves of the lowest branches first attacked, the more recent shoots above remaining for some time uninjured. Again, he says, if the cause had been atmospheric, the whole field would at once have suffered, but instead of this being the case, the disease had always appeared in various ways, sometimes attacking the centre, and then spreading in a star-like manner; at other times passing in straight lines from one extremity of the field to the other, whilst in other cases it made its appearance in one corner, and in a few days the whole field was affected. Mr. Head then gives his own opinion as to the cause of the disease. He states that it first appeared in the year 1845, a few years previous to which date guano was introduced into this country, and was at that time generally in use as a manure throughout Europe. He was inclined strongly to believe that the use of this substance was the original cause, and he was led to this opinion chiefly from the following experiment. He made guano into a paste with rain-water, and upon exposing this to the sun for a few days, the whole mass became impregnated with animalculæ. And he argued from this that the same effect would be produced by the rain and heat of summer under natural conditions, when all exhalations swarming with animal life, which were constantly rising from the earth, would naturally adhere to the leaves of the lower branches of plants exposed to their influence. These would consequently become first affected, and the disease would then spread more or less rapidly through their whole substance. Mr. Head says that an objection had been urged against his theory, from the fact that the disease had appeared in its most malignant character in districts at least fifty miles distant from any point where guano had been used. He thinks that this is easily accounted for thus: when the warm weather sets in, the animalculæ may be found floating in myriads in the air of the guano districts first affected, and would consequently be wafted in various ways to great distances, and would thus affect districts far removed from the original point of attack.

In conclusion, the writer states, that where the haulm was removed at an early period from the diseased plant, and the tubers kept in the ground till the proper period, they were preserved in a better manner than by any other means he had seen tried.

Mr. Bentley said that he had been induced to read the above communication from s relation to a subject of very great practical importance, although the writer was

totally unknown to him, and he entirely dissented from his views as to the cause of the disease. He thought that there would be no difficulty in showing the inconclusiveness of his experiments, and the fallacy of his reasoning.

Mr. Bentley then entered somewhat in detail as to the views of Berkley, Lindley, Smee, Solly, Liebig, Mitscherlich, and others, as to its cause. He thought that each of the theories advanced by them were unsatisfactory of themselves, but that the truth probably lay in a combination of some of them. He believed that the original cause was owing to the high state of cultivation of the potato plant, by which its constituents were somewhat altered, and nearly balanced as regards their chemical affinities; it was thus placed in a somewhat artificial condition. So long, however, as the season was favourable, no injurious consequences resulted; but, on the contrary, in bad seasons (especially those in which there was a great amount of rain and a deficiency of light) no proper exhalation or assimilation of its constituents took place, the plant accordingly became gorged with fluid filled with imperfectly elaborated matters, and the whole balance of affinities was destroyed; decomposition was the immediate consequence, and the plant then became a prey to insects and fungi, particularly the latter, by which the disease was spread rapidly through its whole substance. Mr. Bentley therefore said that he looked upon high cultivation as the *predisposing* cause of this disease; unfavourable atmospheric conditions as the *exciting* cause; and the attacks of fungi and insects as the chief *propagating* cause.

Mr. Bentley said that he entirely agreed with Mr. Head as to the best means of preserving the tubers when once the disease had developed itself in the plants to which they were attached. It was to remove the haulm altogether, and to leave the tubers in the ground to ripen by themselves. He had an opportunity of trying this experiment for himself on a small scale during the last season. The disease had developed itself on the leaves of a potato-bed after the flowering stage, and immediately at his request the haulms were removed from one-half of the plants, while those of the other half were left untouched; the plants were then left till the usual period, and then upon digging the ground for the tubers, those plants which had been left untouched were found to have had nearly all their tubers destroyed, while those from which the haulms had been removed, yielded a fair average crop. Mr. Bentley said that this was a most important point, and he should like to see experiments tried on a large scale, in order that we might arrive at a satisfactory conclusion on the matter. He would be also glad to have the opinions of those present on the subject.

Mr. Braithwaite observed, with reference to the practical point in the paper as to the best means of preventing the disease, that in Herefordshire they adopted the plan of pulling off the haulms soon after the flowering period, and the tubers were allowed to remain in the ground, and arrived at maturity in a perfectly healthy condition. In connexion with the subject of blights he had remarked, in the same county a peculiar disease had attacked the hop plant. On shaking the diseased part a small red worm fell out, which, no doubt, had created the ravages amongst the hops. The disease in the potato had been attributed by the peasantry to the Death's-head moth, which was found abundantly among the potato plants.

Mr. Daniel Hanbury remarked, that the theoretical notions of the author should be received with caution; but that the practical points in the paper, as coming from a practical farmer, were worthy of attention. He did not see how the disease could be attributed to high cultivation, as if that could be admitted as producing it eight years ago, why did it not produce it twelve years ago?

Mr. Braithwaite remarked, that he had observed that only part of a field had been diseased, and the disease showed itself at the time of flowering, or shortly after.

Mr. Greenish had also observed, that the attack of the disease was, in many instances, only partial in a field. He had examined several specimens of diseased potatoes, and found that the starch granules, so far as the disease had penetrated, were altered in their constitution; that they were converted into some state intermediate between starch and sugar, as iodine produced no change. A plan had therefore been adopted for removing the starch from the portion not yet affected by the disease, so that the whole tuber might not be lost.

The Meeting was then adjourned to December 13th.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

The first Scientific Meeting of the North British Branch of the Pharmaceutical Society, for the present session, was held in the Rooms, 72, Princes Street, on the evening of Tuesday, 24th October. H. C. Baildon, Esq., President, in the chair. There was a numerous attendance, including Dr. Inglis, President of the Royal College of Surgeons, Dr. John Gardiner, Dr. Stevenson Macadam, and Messrs. Gardner, Flockhart, Bremner, Shaw, Young, Ainslie, Wm. Baildon, Mackay, &c. &c.

An apology was announced from Professor Christison, who had been summoned in his professional capacity to Inverness-shire. Apologies were also read from Dr. George Wilson, J. F. Macfarlan, Esq., &c. The table was covered with the various specimens which had, during the summer, been contributed to the Museum by Members and others. The books added to the Library were also exposed.

The President thereafter read his

INTRODUCTORY REMARKS.

In opening this session of the North British Branch of the Pharmaceutical Society of Great Britain, I think that I am entitled to congratulate the Members upon the results of the past, as well as upon the prospects of the Society for the present session. But although something has undoubtedly been accomplished, far more remains to be done. I would especially notice as a good omen for the future the success which last year attended the Meetings of the Associates and Apprentices for mutual improvement, evincing as it did a praiseworthy and earnest desire on their part to avail themselves of the means put within their reach by the Council of the Society in granting them the use of the rooms and the Museum for their Meetings. This privilege will be continued, and I sincerely hope that the Meetings will be still more numerously attended. I understand that several of the Associates have left Edinburgh, but as their places will, no doubt, have been supplied, this circumstance should not operate unfavourably upon the attendance.

It is the earnest wish of the Council to give the Associates and Apprentices this and every other facility for pursuing the scientific portion of their education, and I may state that at a recent meeting, it was unanimously agreed to accept of Dr. Macadam's offer to deliver a course of lectures upon Chemistry, in connexion with the North British Branch of the Society. This important branch of education will thus be placed within the reach of parties anxious to attend, at an hour which it is hoped will, in almost all cases, be found convenient for their employers and themselves. As it is very important that this branch of their education should be well acquired, the Council hope that the attendance will be numerous. I have not had the pleasure of hearing Dr. Macadam lecture, but if he approach at all to that able Chemist and excellent lecturer, Dr. George Wilson, with whom he has so long studied I cannot doubt his ability to communicate to others what he has acquired so thoroughly himself.

The Library of the Society is at present of very limited extent, and I am sorry to say that it has not been so extensively used as it is desirable that it should be. Additions have just been made to it, and facilities will now be afforded for taking out and returning the works, which it is confidently hoped will increase its usefulness.

But in thus offering the instruments and aids for obtaining knowledge, we do little unless we are seconded by the earnest determination of the Student himself. For him to achieve success he must love knowledge for its own sake, and pursue it under every difficulty.

The path to excellence is undoubtedly rugged at its commencement. In the words of the great Burke, "Difficulty is a severe instructor set over us by the supreme ordinance of a Parental Guardian or Legislator who knows us better than we know ourselves, as he loves us better too. He that wrestles with us, strengthens our nerves, and sharpens our skill. Our antagonist is our helper. This amicable conflict with difficulty obliges us to an intimate acquaintance with our object, and compels us to consider it in all its relations. It will not suffer us to be superficial."

Compared, however, with the few advantages possessed by your predecessors, the

pursuit to you is easy, and upon yourselves must rest the deep responsibility of using or refusing to use the opportunities now offered you.

In a few short years the present Members will have passed away, and we ought earnestly to endeavour on our part to afford you every facility to enable you most worthily to succeed us, and it should be your determination to repay us by your faithful and more efficient services.

Dr. Stevenson Macadam having very kindly agreed to read a paper in consequence of Professor Christison's unavoidable absence, was introduced to the meeting and read the following communication :—

ON THE DISTRIBUTION OF IODINE IN THE MINERAL, VEGETABLE, AND ANIMAL KINGDOMS.

BY STEVENSON MACADAM, PH.D., F.C.S.,
Lecturer on Chemistry to the North British Branch of the Pharmaceutical Society of Great Britain, and Senior Assistant in the Chemical Laboratory, School of Medicine, Surgeons' Hall, Edinburgh.

Two summers ago I commenced a series of experimental investigations as to the general distribution of iodine. At that time the researches undertaken by M. Chatin had led him to announce the presence of iodine as a normal constituent of the atmosphere. This conclusion had been arrived at after a lengthened course of experimenting, during which Chatin saw reason to believe that he had been successful in directly and indirectly demonstrating the correctness of his statement. *Directly*, by drawing many volumes of air through a solution of carbonate of potash, and thereafter testing the solution; and *indirectly*, by adding carbonate of potash to rain-water, dew, and snow-water, concentrating the liquids, and subsequently testing them. In both series of analyses he obtained a small but variable quantity of iodine. This variation in amount is considered by Chatin as the *special* cause of the presence or non-presence of goitre and cretenism in different localities. For instance, in the district of country which he classifies under the general title of the *Paris zone*, the quantity of iodine present in the atmosphere, in the rain-water, and in the soil, is comparatively great, and to this he ascribes the absence of goitre and cretenism; whereas, in the zone corresponding to that of the *Alpine valleys*, the amount of iodine has diminished to one-tenth of that found in the *Paris zone*, and to this scarcity of the element he attributes the prevalence of goitre and cretenism, which in that zone are endemic.

With the desire to be able to corroborate the results obtained by Chatin on the continent, I subjected to examination large quantities of air, rain-water, and snow, obtained from different districts in Scotland, and although at first it did appear that the search was successful, yet more careful and more complete experiments showed, that no appreciable quantity of iodine could be detected or was present in the atmosphere of Scotland.

In the earlier part of the investigation I followed the processes which Chatin in his published papers has pointed out, and was thereby led into error, for the potash solution which seemed to have detained the iodine of the air, was found on examination to be as rich in iodine before the air was passed through it, as it was after the experiment was concluded. That the potash used in this instance was as pure as the generality of specimens are, was subsequently proved by subjecting to analysis several samples of caustic as well as carbonate of potash, and in every instance iodine was present in greater or less quantity. Being thus debarred from the employment of potash, I sought refuge for a moment in the other fixed alkali, soda; but for the same reason which had excluded potash, I soon learned the uselessness of attempting to employ soda or any of its more generally occurring salts.

Having thus noticed that the alkalies could not be trusted, in the later trials they were dispensed with, and their place occupied by other substances. A minor experiment, in the course of which 300 cubic feet of air were analyzed, having given a negative result so far as regards the presence of iodine, arrangements were made for a trial on a much larger scale. Accordingly 4000 cubic feet of air were transmitted through,

1. A wide tube, containing slips of paper dipped in starch.
2. A condensing worm, nine feet in length, surrounded by a freezing mixture, and attached to a receiver.

3. A tall jar, with pumice-stone, and a few iron filings, with sufficient water to cover them.

4. A similar jar, with pumice-stone, scrapings of clean lead, and a solution of acetate of lead.

5. A condensing worm, nine feet in length, immersed in a freezing mixture, and attached to a receiver.

By this arrangement it was expected that the first condenser (2) would retain the water, vapour, and salts, which the air experimented upon held in suspension, and should the accumulated liquid be sufficient to fill the tube, the excess would be projected into the receiver, and thus be kept from passing into other parts of the apparatus. The jar (3) was capable of retaining any free iodine, and was thus intended as an auxiliary to the starched papers (1). The chips of pumice-stone enabled the air, as it gurgled through the several layers, to come in contact with the reagents contained in the jar. The office to be fulfilled by the lead solution in jar (4) was to retain any compound of iodine which might pass through it; and the condenser (5) was intended to liquefy any watery vapour which might, during the experiment, be carried from the jars (3) and (4).

At the conclusion of the experiment the reagents employed were carefully examined. The slips of paper (1) were not sensibly altered in tint, and did not betray the slightest indication of even a rose-colour when moistened with distilled water. The condensers (2 and 5) contained each a very small quantity of liquid, which, on being tested, did not show a trace of iodine. The contents of the jar (3) were thrown on a filter and washed with cold water. To the filtrate were added some drops of a solution of carbonate of potassa, and the liquid thus rendered alkaline was evaporated to a quarter of an ounce—no iodine was present. The carbonate of potassa used in this trial was prepared by calcining cream of tartar at a white heat, and was so far free from iodine that none could be detected in two ounces of a dilute solution, of which, in testing the contents of the jar, I employed half an ounce. The lead solution in jar (4) was treated with sulphuretted hydrogen, so as to liberate as hydriodic acid any iodine which might be present; the liquid raised in temperature, carefully avoiding ebullition, and filtered. The filtrate was finally treated (like all the other solutions examined by me for iodine) with starch, hydrochloric acid, and nitrite of potassa, and no iodine was present.

As a concluding experiment to this *direct* method of testing the atmosphere, I fitted up larger and more durable apparatus, on the same principle as the foregoing, and forced through it 100,000 cubic feet of air. The result was also a negative one. Calculating from Chatin's observations, and considering the delicacy of the tests employed, the latter experiment ought to have given several ounces of a liquid, every drop of which should have attested the presence of iodine.

Successive quantities of rain-water from different districts were severally treated with nitrate of silver, or with acetate of lead and lead clippings, evaporated nearly to dryness, and tested in the manner stated above. The residue from twelve gallons failed to exhibit the least trace of iodine. More recently fifty gallons were boiled down with copper turnings, and even that quantity failed to yield the minutest trace of iodine. Snow-water, treated in a similar manner, gave a like result, even when employing thirty-six gallons at a time. In these trials I was careful not to add any potash salt, although such was used by Chatin.

These experiments on the air itself, on rain-water, and on snow, have satisfied me, that the atmosphere which floats over several districts, at least of Scotland, is so far free from iodine that none can be discovered there. I am well aware that several communications have recently been laid before the French Academy of Sciences, which tend to verify the accuracy of Chatin's results; but one and all of them are objectionable, from the authors having employed potash and other materials which there is every reason to believe would contain iodine originally. For instance, M. Grange detected iodine in water by means of chloroform and caustic potash. Now, although he confines his remarks principally to river and spring water, and simply alludes to the *rarity* of iodine in snow, yet I do not see how even that can be considered in favour of Chatin's views, for the potash is not specified as other than the ordinary potash in use among scientific Chemists, and therefore the probability is, that like other samples of the same material, it contained a trace of iodine. Moreover, the potash was associated with chloroform; and although I have not succeeded in proving that free iodine accompanies the chloroform of commerce, yet considering

the material from which chloroform is prepared, there is every reason to believe that a certain amount of iodoform is present in every specimen. The chloride of lime employed in its manufacture, is dependent on chloride of sodium for its chlorine, and limestone for its lime, and in both these substances, viz., the common salt and the limestone, iodine is always to be found. Hence it naturally follows, that from both of its constituents bleaching powder is liable to receive iodine, which will remain as iodide of lime, ready to assume the form of iodoform, when distilled with alcohol and water. Another paper is published by M. Marchand, who employed nitrate of silver, hyposulphite of soda, and carbonate of potash, for the purpose of withdrawing iodine from rain water. Of this process it is enough to say, that not only the carbonate of potash, but also the hyposulphite of soda, contain iodine as a constant accompaniment.

Again, M. Barral, during his admirable researches on the presence of nitric acid in rain-water, also looked for iodine, but with the exception of a mere trace in the water collected during the month of June, he was not able to find it; and since he does not state that he evaporated down a separate quantity of liquid for this purpose, it appears highly probable that he may have tested some of the water employed in his nitric acid experiments, and to which he added potash.

Still further, Chatin has communicated that his results are confirmed by M. Martin, of Marseilles, who found iodine in rain-water. As the process followed in this investigation is not published, I am left to conjecture that he pursued that suggested by Chatin. And, lastly, the commission appointed by the Academy of Sciences to report on Chatin's memoirs, have repeated several of his experiments, and notwithstanding the use by them of potash in quantity, have declared their adherence to his conclusions.

As confirmation of my statement, that the atmosphere of the earth does not generally contain an appreciable amount of iodine, I have to advance the researches of Dr. Lohmeyer, who could not find iodine in the atmosphere near Göttingen, and M. Casaseca, of Havanna, who failed to discover the least trace of iodine in the rain-water which fell in the island of Cuba. Their results are the more interesting, as in their analysis they followed the very steps of the process suggested by Chatin, and worked with the very reagents employed by him, whilst at the same time the localities were those where, according to Chatin, the largest quantity of iodine ought to have been found.

Though rain-water appears free from iodine, yet some spring and river waters contain a trace. In 100 gallons of the water forced into the houses of Edinburgh, I have discovered a minute quantity; and the ocean, as well as marine plants and animals, have been long known to contain the element in question.

Terrestrial plants have more lately shown indications of its presence, and Chatin and myself have published separate lists of a large number of such plants. This summer I have extended my investigations to those plants which, to some extent, form the food of the higher animals. The process followed in every instance was exceedingly simple, as I was resolved to risk the loss of iodine rather than introduce that substance in any way. Accordingly, no reagent was added for the purpose of more immediately fixing the iodine, as I am not aware of any which would have been serviceable without endangering the admixture of that substance. In this, my researches on the presence of iodine in plants and animals differ from any other which have been published. Chatin and others drenched their plants with potash previous to incineration, and though it is very probable iodine may be present in the few plants they examined, yet the process followed by them cannot be considered a good one. In examining the plants they were simply *charred* in a large covered iron crucible or chamber, carefully heated to a low red heat. On cooling, the charred mass was ground to powder and digested in water, which dissolved out all the soluble salts, and amongst these, any alkaline iodide which the plant contained. On evaporating this liquid to dryness a variable quantity of saline matter was left, which was treated with alcohol, heated, filtered, again evaporated to dryness, and ultimately dissolved in a very small quantity of water. This liquid was tested with starch, hydrochloric acid, and nitrite of potassa. Proceeding in this way I have demonstrated the presence of iodine in upwards of sixty plants, many of which are edible. Potatoes, wheat, barley, oats, beans, and peas, affords a trace; and the ashes of the pear, the gooseberry, and the apple trees, do so likewise.

The presence of iodine in the food of animals necessitates its introduction into the

system of the animal, and, for a time at least, its retention there. In the earlier trials the animal matter was burned, and the ashes examined, but in no instance was I successful in detecting iodine. Latterly, however, by adopting the system of charring in a covered vessel, so successfully followed in testing plants, I have obtained minute but quite distinct indications of the presence of iodine in the cat, the dog, the pig, the cow, the horse, and man. In every instance but one, muscle was the only part of the animal frame employed. In the horse, however, the lungs, liver, heart, spleen, and kidneys, as well as the muscle, were examined, and each organ yielded iodine. The milk and blood of the cow, and common eggs, treated in a similar manner, gave a like affirmative result.

I do not wish to be considered as giving a positive opinion on the chemical condition in which iodine exists in vegetable and animal matter, but think it worth while to notice, that, notwithstanding the same treatment being followed, I failed to detect any iodine in new and fresh eggs, whilst in rotten eggs a very distinct quantity was found. Now, whilst it is quite probable, that, from some slight and unknown cause, the iodine in the fresh eggs may have escaped, yet I cannot help speculating so far as to say, that the iodine in the fresh egg may exist in the free condition, or at least not in combination with a metal; and that when the egg rots, the sulphuretted hydrogen produced may convert the iodine into hydriodic acid, which, in the presence of the free soda of the egg, will become iodide of sodium, a substance very much less volatile than iodine itself.

The passage of iodine from the animal system has also occupied my attention. With no expectation of a successful result, but wishing to be able to speak experimentally on the subject, I wore a light, starched, gauze respirator for six nights, during which time, about fifty hours, the air inspired and expired by me must have come in contact with the starch. No blue or even rose-tint was imparted to the gauze, and therefore no iodine had left the system by that road. Other experiments showed that the iodine compounds form no exception to the general rule, and accompany the other saline matters in their passage from the animal.

Whilst the animal receives what iodine it requires from the plant, the latter in its turn, no doubt, obtains its supply from the soil. Direct experiments are still wanting to substantiate its presence there, but the fact of its being uniformly a constituent of limestone rocks, necessitates that when these are present in, or applied to, a soil, the latter must to a greater or less extent contain iodine.

Dr. S. Macadam exhibited the new collodion balloon invented by Prof. Müller of Breslau, and for specimens of which, as well as information regarding their mode of manufacture, the Society was indebted to Prof. Crace Calvert, of Manchester. A thick solution of collodion having been prepared, a small quantity is placed in a flask, and the interior of the latter entirely coated with the solution. The excess of liquid is poured out, and the neck of the flask being connected with a pair of bellows, the ether is driven out. To detach the thin film of solid collodion lining the inside of the flask, and which constitutes the balloon, the neck of the vessel employed is connected with a tube, by means of which the operator can by suction produce a partial vacuum. The mouth of the balloon is easily separated by a knife from the neck of the flask, and the lining of solid collodion withdrawn from the mould in which it is thus formed.

Upon finishing his paper, Dr. Macadam introduced the Collodion balloons, which he mentioned had been prepared on the continent, and sent to this country to be shown at the Liverpool meeting of the British Association, but having arrived too late, he had obtained two of them, which he now submitted for examination to the meeting.

Dr. S. Macadam had also received from Professor Calvert specimens of carbazotic acid and of carbazotate of ammonia, for the purpose of laying them before the Society. Carbazotic acid has been used with success by Dr. Bell, Physician to the Royal Infirmary, Manchester, who cured several cases of intermittent fever by means of it. Professor Calvert is of opinion that from its powerful febrifuge properties and its comparative cheapness, it could be usefully and economically employed as a substitute for sulphate of quinine and for the purpose of testing this statement, he will be happy to supply a small quantity to any medical man who may express a desire to have a sample.

Dr. Macadam placed before the Society samples of these compounds. One was

the carbazotate of ammonia, and the other carbazotic acid. These, from their crystalline appearance, were much admired. They were both intensely bitter, and it was supposed, that as a febrifuge and tonic they might perhaps take the place of quinine. In event of these preparations being found useful, one great recommendation in their favour was the very moderate price at which they could both be produced.

An especial vote of thanks having been proposed by the Chairman to Dr. S. Macadam, the same was carried most unanimously.

Thanks were also voted to the Museum and Library Committee, who had devoted so much of their time to the arrangement of the various specimens belonging to the Society.

The Secretary then brought forward the claims of the Phytological Club of London, which, from its importance, he thought deserved the support of the North British Branch of the Society. He named the leading features of the Club, and urged upon Pharmaceutists the benefits likely to accrue from their becoming Members.

The Library and Museum arrangements for the coming winter were then minutely stated, and the meeting adjourned.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Friday Evening, 27th October, 1854.

MR. ABRAHAM IN THE CHAIR.

Mr. H. S. Evans, F.C.S., read a paper on "The Adulteration of Arrow-root, and the best means of distinguishing the different varieties." He said the best arrow-root was the Bermuda, the produce of the Maranta Arundinacea, but under the name of Arrow-root there are several other inferior starches met with, such as Portland, East Indian, and British or Potato Arrow-root. They all possess nutritious properties to a greater or less extent, but few physical or chemical properties, by which they can be distinguished by the naked eye. Hence, as they are of inferior commercial value, we often find them intermixed or substituted for the genuine arrow-root. The majority of these substitutions can readily be detected by the experienced eye with the assistance of the microscope. But beyond these sources of fraud there is another, in which one variety of Maranta fœcula of inferior value is substituted for, or intermixed with that of superior quality. Thus, there are two sorts of Maranta starch of very different commercial value, the Bermuda and the St. Vincent's, and it is no uncommon thing to substitute the latter for the former, wholly or in part. His chief object, he said, was to direct attention to the point, whether or no the microscope was sufficient to detect the sophistication of Bermuda arrow-root with St. Vincent's, since it was commonly thought the microscopic characters of the grains were identical; but before entering upon this he briefly indicated the general microscopic characters of those starches which are most easily detected when mixed with Bermuda arrow-root. (A description of these distinctions without the aid of diagrams would be of little use.) He thought he had got his eye into such practice that he could detect St. Vincent's from Bermuda when mixed together, the grains of Bermuda having a clearer and more solid appearance than those of St. Vincent's, while their body also seems firmer and more convex, and the ridges and markings are very distinct; the hilum also is invariably found at the thicker and broader end. The St. Vincent's, on the other hand, had a less clear and distinct outline, and the markings are not defined with the same decision that those of the Bermuda are. When he entered upon this subject, he had hoped to be able to indicate a simple and easily applied test to distinguish these two arrow-roots, and regretted that the only test was the microscope, to use which, so as to be able to distinguish the two, required the eye to be well practised.

Dr. Edwards expressed his regret that Mr. Evans had not been able to come to a more practical conclusion. He himself had experienced great disappointment in examining well authenticated specimens, having frequently found in them a few grains which appeared to belong to another description altogether; therefore, while the microscope was an extremely valuable adjunct to other methods of investigation, and one which ought to be well studied, he felt certain that it was only by great practice that an admixture of starches could be positively made out. The polariscope he thought afforded a better means of distinguishing the different starch grains.

Dr. Nevins then detailed the results of some experiments he had made on the preparation of Pulvis Ferri, or Quevenne's Iron. He practically showed the meeting the method of obtaining this preparation, according to the directions of the Dublin Pharmacopœia. In this operation, hydrogen is passed over heated oxide of iron, loosely placed in a glass tube, when the hydrogen combines with the oxygen of the iron, and forms steam, which is expelled by the heat, and the iron is reduced to the metallic state, and remains in the form of an iron-grey amorphous powder. If this powder is exposed to the air before it has cooled, it immediately absorbs oxygen, becomes red-hot, and returns to the state of red oxide; but if allowed to cool before exposure to the air, it does not then absorb oxygen so rapidly, and will remain some time comparatively unchanged. He had seen Quevenne's iron, which could not be distinguished from fine iron filings, but had never been able to obtain such in his experiments. If the reduction is not carried far enough, a little red oxide remains unchanged; and if the heat has been rather too high, the iron cakes in the tube, and requires powdering, and when thus caked, the reduced iron on the surface protects the oxide beneath from the action of the hydrogen. He should strongly suspect a sample which had the appearance of fine filings, but should not condemn a specimen as either carelessly or fraudulently prepared because a little red oxide might be present in it.

Mr. Walker said he had prepared a few samples, all of which had the appearance of an amorphous black powder, but the yield was greater than it ought to be; arising, he thought, most probably from some impurity in the oxide, as he had kept the tube in constant motion to prevent caking.

The Secretary read a note from the Literary and Philosophical Society, inviting the members of the Association to a lecture on the 30th instant, by Dr. Scoresby, on "Iron Ships and their Compasses;" and also one from the Polytechnic Society, to attend a lecture by Mr. Townson on the same subject, in the Royal Institution, on Monday, the 6th November, at eight o'clock.

The following donations to the library of the Association were announced by the Secretary:—Two copies of the *New London Pharmacopœia*, translated by Dr. Nevins, with notes, from the author. Nine volumes of the *Medical Times and Gazette*, from Mr. H. S. Evans. Thirteen volumes of the *Pharmaceutical Journal*, from the Council of the Pharmaceutical Society of Great Britain.

On Friday, the 10th Nov., at 8 p.m., Dr. Brett delivered a lecture, illustrated by experiments, on "Combustion and Explosion," with special reference to the late fire at Newcastle, and the danger of a similar explosion occurring, in case of fire, wherever goods of a certain class are stored in the same building with sulphur, turpentine, or other combustible substances.

MANCHESTER CHEMISTS' CONVERSATIONAL SOCIETY.

A Pharmaceutical Meeting was held at the York Hotel Buildings, on Friday evening, November 10,

MR. STANDRING, PRESIDENT, IN THE CHAIR,

when a paper, of which the following is an abstract, was read :—

ON THE PHARMACOPŒIA.

BY MR. JAMES WOOLLEY.

It is a discussed point whether it is the province of a National Pharmacopœia to furnish instructions for the preparation of all the artificial compounds which it contains, or which are in use in medical practice, or should confine itself to formulæ for such of the medical compounds as have not a definite chemical composition; as tinctures, ointments, pills, confections, and syrups, leaving the knowledge of the composition and manufacture of the true chemicals to be acquired by the study of Chemistry and Materia Medica, to which it is presumed that every student has applied himself in his education for the calling he has embraced. If the first of these courses be adopted, the Pharmacopœia will necessarily be a handbook of Medical Chemistry, calling for the publication of frequent editions, and claiming from its editor a constant watchfulness over the discoveries in Chemistry, and an inquiry into the composition of the various new therapeutic agents brought before the public. If, on the other hand, the compilation of the Pharmacopœia be

confined to the second of these objects, its republication is less frequently called for, the chemical preparations are left to the competition of private manufacturers, and, by a division of labour and the simplification of processes on a large scale, the most economical results are obtained. The following examples may be quoted of the successful result of removing such preparations from the formulæ of the Pharmacopœia, viz., benzoic acid, citric acid, tartaric acid, nitrate of silver, sulphate magnesia, the salts of morphia, acetate of lead, nitrate, chlorate, and bicarbonate of potash, iodide of potassium, sulphate of quinine, &c.

It may be asserted that these compounds have not deteriorated in purity in the hands of the commercial manufacturer, whilst the cost of some of them has been reduced many fold. Objection might be taken to this course on the ground that it would apparently place the Pharmacopœia, our only authorized code of formulæ, in the rear of the current pharmaceutical knowledge of the day, and that new remedies would have for a long time to undergo the ordeal of empirical and irregular practice before they could be incorporated in our Pharmacopœia.

Examples might be quoted of medicines now long in general use not yet incorporated with the national formulæ, viz., acetic ether, aconitine, phosphate ammonia, oxide silver, arnica montana, root and leaves, sulphate of bebeerin, cantharidin tissue, gelatine capsules as a vehicle for active medicines, cotyledon umbilicus, dolichos, emetina, fel bovis, ammonio tartrate of iron, iodide of iron, iodide of arsenic, iodide of arsenic and mercury, magnetic oxide of iron, glycerine, jalapine, carbonated solution of magnesia, sulphate and bimeconate of morphia, citrate of quinine and iron, salicine, santonine, tannin, the salts of valerianic acid, the concentrated infusions, expressed juices, &c. To this it may be argued that it is good to be so, that changes in our nomenclature or formulæ should not hastily be made, that the introduction of the new chemical nomenclature into the Pharmacopœia, though coming long after its use had become common amongst Chemists, occasioned confusion and uncertainty in some of our preparations, and thus that it is well new remedies should be tried by the test of experience before being drafted into the Pharmacopœia as a part of our collection of standard formulæ.

Another important object to be aimed at in the construction of a Pharmacopœia is to afford the means of readily ascertaining the elementary composition of the different preparations which it contains. If this were accomplished as concisely as possible, by symbols with a centigrade scale in the case of chemical preparations, and by a percentage composition in the non-chemical pharmaceutical compounds, their preparation would be much facilitated and their doses more readily ascertained. For example, tincture of opium now is opium, 3 oz., spirit, 2 pints. Its composition thus requires some calculation ; but if it were opium $7\frac{1}{2}$ parts, spirit 100 parts, it would at once be seen that it contains $7\frac{1}{2}$ per cent. of opium, and that 20 grs. of the tincture should hold in solution one-and-a-half grain of opium. Confection of opium instead of being opium ℥vi, long pepper ℥j, ginger ℥ij, carraways ℥iij, tragacanth ℥ij, would, slightly altered, read opium 11, long pepper 15, ginger 29, tragacanth 4, carraway, 41 parts=100. Iodide of mercury would read, mercury, 61.5, iodine, 38.5=100. In short, let the components be given so as to form 100 parts of the compounds, the figures opposite each ingredient representing its percentage, and how simple the constitution of our Pharmacopœia becomes. By this means we abolish the complicated and contradictory use of two measures of weight having the same name, and we also adopt an uniform standard both for solids and liquids, and render it easy to prepare any quantity of a preparation by a single multiplication. Our measures should be graduated in grains, taking as now, distilled water as the standard, and would thus require no other apparatus for testing their accuracy than a delicate balance. A carefully devised and arranged series of tests by which the Pharmaceutist, without possessing a store of analytical knowledge, could ascertain the commercial purity of his stock, is a great desideratum, and is, I think, the legitimate province of a Pharmacopœia to provide. This has been partially attempted in the case of some of the chemicals, but if it could be carried out with the pharmaceuticals generally so as to provide a standard of their strength and purity, the Druggist would no longer, as frequently now, need to walk in ignorance of both.

A vote of thanks having been given to Mr. Woolley for his interesting paper, the subject elicited some discussion, in which the author's suggestion of the Phar-

macopœia proportions being constructed on a decimal scale, was very generally approved of.

The Committee are happy to state that Mr. Grindon (Lecturer on Botany at the Vine Street Medical School) has kindly promised a paper for the next meeting in December.

JAMES ROBERTON, *Secretary.*

CHEMISTS AND DRUGGISTS' INSTITUTE, MANCHESTER.

A COURSE of lectures for the professional instruction of the Assistants and Apprentices of this trade, who have formed a promising institution for their mutual improvement and study, at the Wellington Chambers, Market Street, was commenced on Wednesday afternoon last, by Mr. Daniel Stone, to an audience who quite crowded the room. Mr. Stone introduced his lectures, which are to extend over a period of six months, with the remark that they were designed to traverse an extensive and interesting field of research, and that the subject of *heat* was a very fitting one to begin with. The earliest chemists, the alchemists, were chemists by fire, which they employed in almost every process,—and the chemistry of this day, too, greatly depended on the study of the laws of matter when subjected to heat. The elements of matter had certain definite proportions in which they combined with each other ; but those proportions were not invariable, because they might be modified by certain agents ; and this variety of natural phenomena was caused by the imponderable forces of heat, light, and electricity. Though heat was so familiar to our sensations, we had much to learn, and very much to unlearn of it ; we could not rely upon our sensations, but must take to the thermometer, to judge of its amount ; and of its nature we were, to a great extent, ignorant ; Mr. Joule, of Salford, being the man, perhaps, who had given us the most correct *formulæ* for such an inquiry, and had attained the most insight into that subject. But no man had seen heat at any time, and no one had ever seen a particle of matter destitute of heat, and none had succeeded in isolating the principle of heat. It added nothing to the weight of the bodies which contained it, and its nature, like that of electricity and light, was yet a mystery. But its effects were well known. After this preface, which was very well framed to invite the attention of his younger hearers, the lecturer explained the principal laws of heat, as they were peculiarly exhibited in solid, liquid, and gaseous bodies. He illustrated that of expansion, by showing a copper bar heated, and placed in a pyrometer, where its elongation was indicated; he also showed the effect of heat, in the enlargement of a sort of small organ-tube, or whistle, which was in perfect unison with its fellow, when it was cool, but was brought into discord by a momentary application of the lamp. He mentioned several facts, commonly observed in certain mechanical operations, which belonged to the laws of heat, as he explained them. He referred to some tables giving exact information of the different ratios, in which, at a given degree of heat, various substances will increase their bulk. No style of teaching could be more agreeable and clear than that of Mr. Stone, who succeeded admirably in engaging the interest of the listeners, and conveying to their minds a great deal of valuable knowledge, very logically arranged.—From the *Manchester Examiner and Times*, Wednesday, Oct. 25, 1854.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE STEAROPTEN OF THE OIL OF THE PTYCHOTIS AJOWAN,

AN UMBELLIFEROUS PLANT FROM THE EAST INDIES.

BY JOHN STENHOUSE, LL.D, F.R.S.

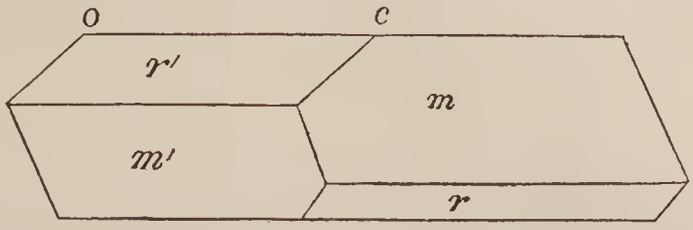
A FEW months ago I obtained a quantity of this stearopten from the late Dr. Stocks, whose recent premature death has been such a loss both to science and to the medical service of the East India Company.

Dr. Stocks states that "this stearopten is not found in the bazaars of Scinde, but in the druggists' shops at Poonah and other large towns in the Deccan.

"It is called Ajowan Ka Phul (sublimed Ajowan), and is prepared from the grains or pericarps of the Ptychotis Ajowan, an umbelliferous plant, well known

in India for its aromatic and carminative properties. It is made at Oojein and elsewhere, in Central India, during the cold season, and is said to form spontaneously on the surface of the distilled water of the Ajowan grains."

The stearopten forms very transparent and symmetrical crystals, some of which are more than a quarter of an inch long. They were submitted to Professor W. H. Miller, of Cambridge, who states "that they belong to the oblique system; cleavage *m* very perfect.



"The angles between normals to the faces are, as far as the small number of observations give results that can be depended on:—

m	*m'*	.....	81° 10′
m	*a*	.....	49° 25′
m	*c*	.....	81° 25′

"I was unable to determine the positions of the faces *e*, *r*, in consequence of their assuming a roundness, produced, I imagine, by evaporation from the surface of the crystals.

"This supposition is rendered probable by the strong odour they emit, and by the circumstance that some fragments of sealing-wax in the box in which I placed the crystals became soft, and that the wax cement by which the crystals were fastened to the branch of the goniometer became extremely soft in a few hours."

The crystals of the stearopten are heavier than water; their odour is very peculiar and pungent, somewhat resembling the oils of thyme and marjorum. Their melting point is 42° C., and they can be distilled over in a current of carbonic acid gas. After having been dried in vacuo they were analyzed in the usual way with chromate of lead.

I. 0.1613 grammes of substance gave 0.411 grammes of carbonic acid and 0.1372 grammes of water.

II. 0.22 grammes of substance gave 0.5555 grammes of carbonic acid and 0.1895 grammes of water.

	Calculated.			Found.	
C_{44} =	264	69.84		69.49	68.86
H_{34} =	34	8.99		9.45	9.57
O_{10} =	80	21.17			
	378	100.00			

From these results therefore, it follows that the empirical formula of the stearopten is C_{44} H_{34} O_{10}.

The stearopten is a perfectly neutral body, and neither combines with alkalies nor acids, but by boiling with strong acids or alkalies it is decomposed. The products of the decomposition have not yet been examined.

When a stream of chlorine gas was passed through the melted stearopten, it was rapidly absorbed, and so much heat was evolved that the vessel containing the stearopten required to be cooled.

The chlorine compound has a deep yellow colour, and crystallizes in beautiful needles. The original stearopten is exceedingly soluble, both in alcohol and ether, but the chlorine compound is much less soluble in cold alcohol and ether, but tolerably soluble in hot alcohol. After having been several times crystallized out of alcohol, and submitted to pressure between folds of blotting-paper, it is rendered perfectly pure.

After having been dried in vacuo:

0.2485 grammes of substance gave 0.4185 grammes of chloride of silver.

0.423 grammes of substance gave 0.634 grammes of carbonic acid, and 0.154 grammes of water.

	Calculated.		Found.
C_{44} =	264 ...	40.37	40.265
H_{26} =	26 ...	3.97	3.988
Cl_8 =	284 ...	43.43	43.094
O_{10} =	80 ...	12.23	
	654	100.00	

The formula of the chlorine compound is therefore C_{44} H_{26} Cl_8 O_{10}.

If the action of the chlorine on the stearopten be continued longer than is necessary to produce the crystalline compound (which is usually formed in from two to three hours), it begins to be decomposed, being converted into an uncrystallizable resin.

Bromine acts readily on the stearopten, but the combination which it forms with it is not crystallizable.

When the stearopten was digested with nitric acid it temporarily assumed a deep green colour, and was changed into a deep yellow resinous substance, which was but slowly acted upon by nitric acid; but by long-continued digestion in nitric acid colourless crystals were produced, which were not oxalic acid; but the quantity obtained was too small to enable me to submit them to further examination.

Hydrochloric acid has no action upon the stearopten.

The stearopten cannot be distilled over anhydrous phosphoric acid unchanged, but is converted into a green substance soluble in alcohol, and precipitated from this solution by water in the form of a dark green thick liquid, having an acid reaction, and not crystallizable either in the free state or combined with potash.

ON THE DETECTION OF BLOOD UPON CLOTH, IRON, AND OTHER SUBSTANCES.

When blood has been for a long time in contact with certain substances it undergoes such a change in its properties that it cannot be recognized by the usual tests, but the examination of blood, even in the dried state, when unmixed with other substances, offers no difficulty, and very small quantities of it suffice for the purpose.

The following is the best method of making the examination:—The dried blood is to be treated with repeated quantities of cold distilled water, until it is quite exhausted, each washing being kept apart. The remaining fibrous mass is then to be examined with the microscope, and, if necessary, compared with a portion of dried human blood expressly prepared by treatment with cold water.

The portion soluble in water is, in the next place, to be examined, and for this purpose the first washing is used, as this contains the greatest amount of soluble matter. Part of this solution is to be boiled, when coagulation to a greater or less extent will take place, depending upon the quantity of soluble matter present: if, however, this quantity be very small, the boiling will only cause an opalescence. The coagulum is of a dirty red colour, and is easily soluble in a boiling solution of caustic potash. This solution, when examined in a test tube, is green by transmitted light and red by reflected light.

To a portion of the solution chlorine water is to be added in such quantity that the odour of chlorine shall be persistent. The colour of the liquor will disappear and white flakes will be formed, which generally swim on the surface.

If nitric acid be added to another portion of the solution a greenish white precipitate will be formed.

Tincture of galls produces a slightly violet-coloured sediment.

When there is only a small spot of blood to be examined upon a cloth, it is best to proceed as follows:—

After having thoroughly exhausted the spot with water, the first washing is to be boiled, and when it has coagulated caustic potash solution is to be added, and if this produces the result already described, the solution is to be divided into two parts. One part is to be mixed with a concentrated solution of chlorine, when white flakes should be produced. The other part is to be acidulated with nitric acid, when a precipitate should be formed as already described.

A minute description is given in scientific works of the method of detecting spots of blood, especially when they are on uncoloured linen or cotton. The colouring matter of the blood is to be extracted with cold water, and the fibrous mass remaining upon the cloth scraped off and examined with a microscope. But if the spots are upon coloured stuffs, and especially those containing nitrogen, such as silk, wool, &c., they cannot be recognized without difficulty. I had occasion, myself, to examine some small drops of blood upon a coat. I could only convince myself of their presence by the use of a magnifying glass. The spots were scraped off with great care, but I could not avoid taking off several of the wool fibres as well. The scrapings were put into a porcelain dish and wetted with a few drops of water. It became reddish coloured by long digestion. The liquor was poured off from the undissolved matter which could not be examined microscopically in consequence of the fibres of wool. The washings were boiled, when a slight coagulation took place, and the solution answered to all the before-mentioned tests.

Of still greater importance, however, is the detection of blood which has dried upon the surface of iron. In an examination of this kind I met with difficulties not mentioned in other treatises on the subject.

Vauquelin was the first who mentioned that iron rust, formed in the interior of habited houses, contains ammonia.

Chevalier, who confirms this observation, found ammonia in the natural oxides of iron which had not been kept in immediate contact with the air.

Austin too has observed, that if iron is oxidized by contact with air and water, ammonia is formed.

It follows, therefore, that if an iron instrument covered with rust is suspected to contain traces of blood, the evolution of ammonia on applying heat, affords no indication of its presence. If, however, after slightly heating the rust in a dry test-tube, the ammonia is driven off, and then, by employing a stronger heat, the well-known offensive smell produced by the calcination of all albuminous substances is developed, and a brown empyreumatic oil condenses on the upper part of the tube, the presence of blood may be suspected. Its presence may be further ascertained by fusing a small portion of the suspected rust with an equal portion of sodium in a very small test-tube, treating the fused and cooled mass with cold water, and adding to the filtered liquor first a salt of the mixed oxides of iron, and then a little hydrochloric acid. If blood was present, Prussian blue would be formed.

These results would necessarily be obtained if blood was present in iron rust, even in very small quantity, but they would not necessarily indicate the presence of blood, as any other organic substance containing nitrogen would afford the same reactions. If, however, the iron was simply oxidized by exposure to moist air, the results indicated would certainly not be obtained.

Spots of blood dried upon a bright surface of iron may be easily distinguished from rust spots, the former being of a darker brown, or only light red when the blood has been very thinly spread upon the metal. There is a marked difference also, in the facility with which the blood spots may be separated from the iron, leaving a bright place underneath, while rust is firmly attached, and can only be separated with much difficulty. If, therefore, a knife stained with blood has been kept for a long time, it is possible that the dried blood may have become detached by friction.

A knife was sent to me which there was reason to think had been used in the commission of a murder. This murder took place during the summer time in a cornfield, and the knife remained upon the field for a long time before it was found. The blade of the knife was covered with rust, from its lying on the damp ground, so that only a few spots of the metallic surface of the knife could be seen. The surface had exactly the appearance of the rust caused by the influence of moisture and air upon metallic iron. The rust being carefully scraped off, a portion was heated in a test-tube, and ammonia was given off so as strongly to change the colour of reddened

litmus paper. On subsequently submitting it to a stronger heat there was no disagreeable smell evolved, nor any traces of empyreumatic oil. The rust fused with sodium, as already described, yielded no Prussian blue. It was a folding knife, but it was sent to me unfolded, and most probably had been found in that state, consequently the rain had washed away all traces of the blood before the rust was formed. The interior of the handle of the knife was filled with a dark, almost black, substance, which after being scraped out was still a little soft, but subsequently hardened to a brittle mass. A small portion of it heated in a test-tube behaved like dried blood, producing a strong offensive smell, and yielding an empyreumatic oil, and the heated residue fused with soda gave a considerable quantity of Prussian blue. A larger quantity of the black mass being treated with water the solution did not acquire a red colour even after long digestion with the aid of heat, care being taken that the temperature was not high enough to coagulate the albumen. After filtration it proved to have only a very small trace of albuminous matter in solution. By boiling the undissolved residue, however, in caustic potash, a solution was obtained which was green by transmitted light and red by reflected light, and upon applying the proper re-agents it behaved like a solution of the colouring matter of blood in caustic potash. The residue, after treatment with water and caustic potash, being dissolved in hydrochloric acid, and ammonia being added, peroxide of iron was precipitated.

It appeared, therefore, that the black mass in the handle of the knife consisted principally of dried blood and oxide of iron, the latter being derived from the rusty surface of the interior of the handle.

From the presence of such a large quantity of peroxide of iron the dried blood had lost one of its principal characteristics, namely, its solubility in cold water. In fact, I found by comparative experiments, made in great number, that the soluble portion of dried blood is entirely precipitated from its solution by moist hydrated oxide of iron. That this is really the case appeared also from the further examination of the contents of the knife-handle. Besides the black mass already described, there was a small piece of wood fastened where the point of the knife went into the handle. This wood, especially on one of its sides, was covered with dried blood, and most probably had not been in contact with the oxide of iron. By examination with the magnifying glass it could easily be recognized as dried blood. The piece of wood was suspended in a test-tube with water. In a short time there were, especially from that part where the blood was thickest, red streaks sinking to the bottom of the tube, leaving on the wood a flaky voluminous mass, becoming of a lighter colour by further treating it with water. After two days the wood was taken out of the water, and the flaky mass was examined by the microscope. It was perfectly identical with the fibrous mass expressly prepared from human blood. The water in which the wood was digested answered exactly to the reagents for the colouring matter of blood.

The property of hydrated oxide of iron to combine with the soluble portion of blood and to render it insoluble in cold water being a most important character, I made the following experiments with the view of confirming my previous results :—

If freshly prepared moist oxide of iron be macerated in the cold with a dilute solution of the colouring matter of the blood for twenty-four hours, shaking it occasionally, the filtered liquor would be colourless ; and upon boiling the oxide of iron with caustic potash, the blood would be dissolved and easily detected by the proper reagents.

If, instead of moist, calcined oxide of iron be employed, the filtered liquor would be coloured, yet on boiling the oxide afterwards with caustic potash a considerable quantity of blood would be extracted.

We therefore see that the more recently prepared the oxide of iron is, the better it decolourizes a solution of blood.

A solution of blood was mixed with a sufficient quantity of chloride of iron, and ammonia added so as to precipitate all the peroxide of iron. After filtration a colourless liquor remained which contained no blood. It must be understood that in these experiments the blood was not used in sufficient quantity to prevent the precipitation of the iron.

If a solution of blood be mixed with solution of sulphate of peroxide of iron and ammonia (iron alum) and then treated with ammonia, a colourless liquid is not

obtained after filtration, even if the iron salt were used in considerable quantity; but by making a similar solution, and previous to the addition of the ammonia adding a solution of sal ammoniac, a colourless liquid is obtained.

If blood be allowed to dry in a rusty iron vessel, and the dried mass be moistened with water and again dried, this process of moistening and drying being repeated several times, a mass is obtained which is perfectly insoluble in water, but which, on being boiled with caustic potash, yields by filtration a deeply coloured solution, in which the presence of blood is easily ascertained by the appropriate tests. The undissolved oxide of iron separate from the potash solution, on being treated with hydrochloric acid and tested with ferricyanide of potassium, afforded evidence of the presence of a portion of protoxide of iron.

If, instead of the rusty iron vessel, one with a bright metallic surface be employed, a much longer time is required before the blood loses its solubility in cold water; at length, however, a brown, almost black, mass is obtained, which is easily powdered, does not communicate any colour to water, and possesses the same characters as the mass found in the handle of the knife.

Hydrate of alumina acts upon blood in a similar way to hydrated oxide of iron. When freshly prepared and digested with blood, the filtered liquor is colourless and contains no blood; but it appears that a given quantity of blood requires more alumina than oxide of iron to render it insoluble. A solution of albumen is not so easily acted upon by either oxide of iron or alumina as solution of blood is.

A diluted solution of blood digested and frequently shaken with powdered clay required a very long time, more than a month, to render the liquor colourless, the blood, meanwhile, beginning to decompose and develope the well-known smell of putrid cheese. The filtered solution contained a small quantity of ammoniacal salts, but no blood. Upon boiling the separated clay with caustic potash a green liquid was obtained in which the presence of blood could easily be detected. If, however, a very concentrated solution of blood be left in contact with clay the blood would not be rendered insoluble. It would decompose, and after some months would still retain its red colour. The separation only takes place when the blood is diluted.

These remarks are somewhat opposed to the result of an experiment of Lassaigne's. He poured some blood upon a ground composed of fine clay, to ascertain after how long a time the presence of the blood could be proved. The spot was exposed during a month to rain and light in the open air, and it had then assumed a paler and more of a greenish colour. The clay with the blood was powdered and digested with cold water for twelve hours. The filtrate was of a brown colour, and contained blood. The insoluble residue had still a greenish colour, and after some experiments, the presence of blood was proved. Lassaigne did not heat the clay with caustic potash. Had he done so, the evidence of the blood would have been much more striking. Lassaigne concluded from his experiments, that blood spilled on the ground may be detected a month after the occurrence. Probably, however, the result would have been different if the blood had been diluted instead of being used in the concentrated state, or if a longer period had been allowed to elapse.

The discovery of blood becomes much more difficult if spilled upon garden ground rich in humus. I digested a dilute solution of blood with earth from a garden for some months. After filtering it, the liquor was colourless. On evaporating some of it upon platinum foil a very slight residue was left, but it contained no blood. The earth was then boiled with solution of caustic potash, when a deeply coloured solution resulted, but which did not produce the peculiar effect already noticed upon light, probably owing to the large amount of humus dissolved by the caustic potash. On acidulating the alkaline liquor a precipitate was formed, similar to that produced by acids in solution of pure humus in caustic potash. To discover the presence of blood in such a liquor, I saturated it with chlorine water, which produced white flakes, similar to those produced from any albuminous substance, and which would not be produced from a solution of pure humus.—*Praktische Pharmacie.*

ACONITIC ACID IN DELPHINIUM CONSOLIDA.

BY W. WICKE.

Aconitic acid has been found in *Aconitum napellus*, *A. stærkianum*, *Equisetum fluviatile*, and *E. limosum* (and at first called equisetic acid). Berzelius pointed out that the relation between aconitic and citric acids is the same as that between fumaric and malic acids, Robiquet having found that by dry distillation citric acid yielded aconitic acid.

From the close relation between aconitum and delphinium, and from the opinion that a morphological resemblance between plants indicates similar productive agency, the author considered it probable that aconitic acid exists in the latter, and the result of his examination proved that his conjecture was well founded. The herbaceous part of the plant, after flowering, was submitted to examination.

The expressed juice was boiled for about half an hour to separate albumen and chlorophyle, strained, oxalic acid added to separate lime, the filtrate treated with acetate of lead; the lead salt decomposed by sulphuretted hydrogen, and these two operations repeated until a tolerably colourless liquid was obtained. It is extremely difficult to separate the colouring substances.

This liquid, evaporated to dryness, was treated with ether, when the aconitic acid was obtained on evaporation in the characteristic form of warty masses of crystals. The crystals were likewise very readily soluble in alcohol and water. When heated in a tube there distilled off drops of a liquid which crystallized (itaconic acid) and a voluminous coal remained.

The analysis of the silver salt gave 69.57 per cent. oxide of silver. Calculation gives 69.21 per cent.—*Annalen der Chemie und Pharmacie*, April, 1854.

PRACTICAL OBSERVATIONS ON THE OINTMENT AND TINCTURE OF CUCUMBERS.

BY M. EMILE MOUCHON,
Pharmacien at Lyons.

M. Buron has effected a great improvement in preparing cucumber ointment, and rendered a real service to Pharmacy by introducing the use of the tincture of cucumbers, the process for which he has originated. His ointment into which this useful product enters is prepared in a manner as simple as it is easy. It possesses indeed some advantages, but is not what it ought to be when compared with what is procured from Paris. It is far from presenting in the same degree the perfect whiteness, the aroma, and lightness, which characterize the Parisian preparation.

Starting from the same basis as M. Buron, that is, replacing the juice by the tincture, we may arrive at the formation of an ointment of as good quality, almost as white, as light, more agreeably aromatic, and keeping better, than that which the Parisians have so well taught us to appreciate.

To give the ointment all these qualities combined, we should proceed in the following manner, both in the preparation of the tincture, and in that of the ointment itself:—*Tincture of Cucumbers.*—Take of cucumbers of medium size, 514 ounces; rectified spirit, at 36° (sp. gr. 837), 32 ounces; reduce the cucumbers to a pulp without cutting off any part; incorporate the spirit with the mass; place the entire on the diaphragm of a still, lute the apparatus, and at the end of twenty-four hours distil 32 ounces of tincture at 19° of the aerometer (sp. gr. 935).

Although I use the spirit in a proportion nearly double that which M. Buron prescribes, the tincture is as strongly aromatic as his, the standard of which does not reach 14° (sp. gr. 973). This difference of density depends, on the one hand, on the relative proportion of the cucumbers and the alcohol; on the other, on the employment of a stronger menstruum than is ordinarily made use of, 36° (sp. gr. 837), instead of 34° (sp. gr. 847).

The 32 ounces of alcoholic product, containing only a part of the alcohol employed, and the cucumbers not yielding all their aroma to it, we may with advantage continue the distillation so as to collect an additional 32 ounces of alcoholic liquor at 16° (sp. gr. 955), tolerably aromatic, and very fit for ulterior use, especially after rectification in the water-bath. It is easy to understand, in fact, that not only do we thereby obtain a considerable quantity of liquid, which it would be a loss to leave in the residuum of the distillation, but also that the employment of this

second product may advantageously replace that of alcohol in proceeding to a fresh preparation of the tincture, the aroma it possesses enabling it to gain an additional quality to what is produced thereby.

Pomade of Cucumbers.—Take of benzoinated officinal lard,* 375 parts ; stearine, 125 parts; tincture of cucumbers, 60 parts. Divide the stearine into small portions, melt in the water-bath with the benzoinated lard ; pour the fused mass into a large marble or polished stone mortar ; beat it continuously while cooling ; add the spirit, and continue to beat it in the same manner until it has acquired the greatest possible whiteness and lightness.

Prepared in this way, cucumber ointment not only possesses the properties of the Parisian article, especially of that manufactured by M. Chardin-Hadancourt, which is generally looked on as the best, but it has also the advantage of keeping perfectly for a long time, in consequence of the aromatic principles communicated to the benzoinated lard by the adoption of my process, principles which seem besides to contribute to the beauty of the product by facilitating the molecular interposition of the atmospheric air it requires to give it the necessary degree of perfection.

M. Pottier, a Pharmacien at Auxerre, published in the *Repertoire de Pharmacie* for 1847 † a process which would have the advantage of substituting a hydrolat of cucumbers for the spirit of M. Buron, but which did not afford a product capable of being kept so long, although the hydrolat itself may be preserved for several months without change. By applying Appert's process to it we would give it the property of keeping much longer.

The adoption of the hydrolat would be economical, but it would be contrary to true pharmaceutic principles, as it is necessary to avoid as much as possible the introduction of water into fatty matters which we wish to preserve from decay. It is therefore advantageous, in more than one point of view, to employ spirit of a very high density in the preparation of the tincture. It should, however, be observed that the objection raised against the hydrolat loses its force when the benzoinated exunge is employed, for the chances of preservation or alteration are no longer the same as they would be with ordinary lard.

To those who might object to the presence of alcohol in an ointment such as the present I would say, that after having diligently beaten this product we do not find any trace of spirituous liquid in the mass, as this mass is, in consequence of the total evaporation of the alcohol, only the exact representation of the weight of the lard and stearine combined.

As to the benzoin, I do not think it can give rise to such an objection ; the simple fact of its frequent employment as a cosmetic (*le lait virginal*) not permitting us to attribute to this substance thus diluted other properties than those usually assigned to it, the more so as it here occurs in an extremely small proportion, so small that its employment would not be unreasonable, even if it were considered to be an irritant. I can therefore see in it only an auxiliary, the double utility of which appears to me to be incontestable.—*Journal des Connaissances Médicales Pratiques et de Pharmacologie*, 10th August, 1854, p. 445, and *Dublin Quarterly Journal of Medical Science.*

MERCURIAL OINTMENT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In your last Journal I observed an article headed "Preparation of Strong Mercurial Ointment." I tried to prepare the ointment in the way directed, but did not succeed satisfactorily.

A process that I often have recourse to, and one which I think is worthy of your notice, is, to mix potassæ *sulphatis* ℥iss. with adipis ℥iij., and then to add hydrargyri lbj., now rub them together for a few minutes, and the mercury will totally disappear. The proper quantity of lard, &c., can then be added to form the ointment. Pil. hydrargyri can be prepared in the same way, substituting honey ℥iij. for the lard, afterwards adding conf. rosæ q. s. I remain, Sir, yours, &c.,

Peterborough, October, 1854. Marshall Heanley.

[This and other similar suggestions may be worthy of the notice of the Pharmacopœia Committee.—Ed.]

* Prepared by heating in a water-bath for two or three hours 120 parts of coarsely powdered benzoin and 3000 parts of lard, straining through linen, and stirring constantly till cold.—Ed.

† Page 310.

ZINC OINTMENT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Portobello, November 16th, 1854.

Sir,—As it is not the practice in this part of the country to make the *unguentum zinci* by the London formula, I was not fully aware of its unsatisfactory nature when so prepared till I saw the remark regarding it in your last Journal.

I have long felt, however, that there are two objections to the London preparation, but which do not seem to have been taken notice of; first, it is made with lard alone; and, second, it is much too soft; and it has occurred to me that these two circumstances may have some connexion with the difficulty of getting it to keep good for a length of time.

But as the second objection applies also to the Edinburgh preparation, it was long since found necessary to modify it so far as to obviate it, and thereby improve the consistency. It would appear, however, that the improvement did not stop here, but that its quality generally has been improved; for it is by no means the kind of article that the remarks referred to would lead me to suppose. There is not only an entire absence of complaints as to its want of permanence, but very much the reverse.

I have for some years prepared the ointment by the formula subjoined, and found it excellent, both as to consistency and durability, never, so far as I have observed, showing any *peculiar* tendency to become rancid, or requiring the employment of unusual means in order to secure its preservation.

I have thought it right te make these observations not only because I think they may possibly be of some use to the Pharmacopœia Committee, but also because I feel assured that if the ointment were prepared either as here suggested, or with ceratum cetacei, Ph. L. (using decolourized oil), the result would show that the addition of benzoin or benzoic acid was quite unnecessary, and therefore to be avoided.

I am, Sir, your most obedient servant,

David Kemp.

℞ Axungiæ Opt.,
Ol. Oliva. purif., āā, ℥x.,
Ceræ Albæ,
Cetacei,
Ox. Zinci, āā, ℥v. (Howard's). ℿ fl. ung.

Melt in a water-bath, strain into a warm mortar, stir, and just before cooling, add the zinc, and continue the stirring very briskly till quite cold.

N.B.—If the temperature be too high when the zinc is added the colour is impaired.

QUANTITATIVE SEPARATION OF NICKEL AND ZINC.

Wöhler* recommends the following process:—

The solution containing the two metals is concentrated by evaporation, mixed with excess of caustic potash, and then with hydrocyanic acid, until the precipitate is redissolved. From this solution zinc is precipitated as sulphuret by mono-sulphuret of potassium, while the nickel compound is not affected. Sulphuret of ammonium is not applicable for this separation.

The filtrate containing nickel is boiled for some time with chlorate of potash or strong nitro-hydrochloric acid, and when the cyanide is decomposed the nickel is precipitated in the ordinary way.

NEW BASE FROM THE FRUIT OF STRYCHNOS NUX VOMICA.

Denoi† has found in the concentrated mother-liquor obtained in the preparation of strychnine and brucine a third base, which he calls igasurine, from *igasur*, the native name of St. Ignatius' beans.

He describes the substance as a colourless precipitate, which becomes crystalline when left in the mother-liquor. It then appears as brilliant silky needles, con-

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* Liebig's *Annalen*, March, 1854.

† *Journ. de Pharm. et de Chimie*, xxv., 202.

taining ten per cent. of water, and very bitter. It has the greatest resemblance to brucine except in its solubility. It dissolves readily in 200 parts of boiling water, and crystallizes out quickly when the solution cools. Brucine requires for solution 500 parts of boiling water, and crystallizes out again very slowly. Bicarbonate of potash or soda precipitates igasurine from solution in the presence of tartaric acid, but not brucine. The physiological action of igasurine he states to be intermediate between that of strychnine and that of brucine. Its influence upon polarized light, and its behaviour with the usual reagents, are almost identical with those of brucine.

NATURAL DEPOSIT OF SALTPETRE.

Professor W. H. Ellet, of the United States, reports that there has been discovered in Bradford County, Pennsylvania, a regular vein of nitre, believed to be unique in its character. The nitre occurs as a solid and uncrystalline deposit in the horizontal seams of a sandstone rock, and in veins proceeding from them at different angles; and the rock itself, which is quite porous, is abundantly charged with the same material. The nitre itself is very pure, containing mere traces of nitrates of lime and magnesia. The sandstone in which it occurs is siliceous, containing a little carbonate of lime, and a notable quantity of silicate of potash.

ARTIFICIAL FORMATION OF CINNAMON OIL.

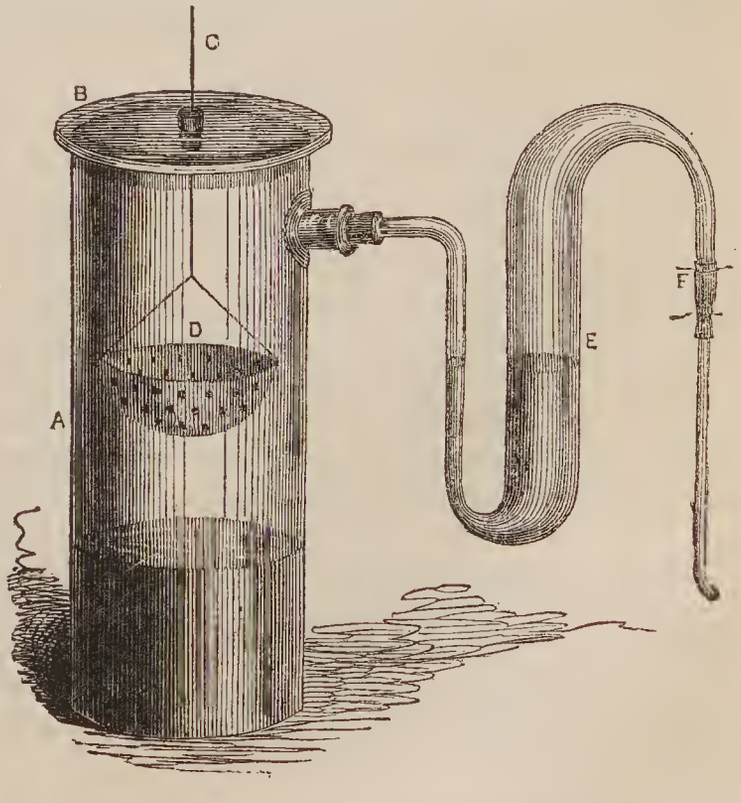
Some years since Strecker showed that styron—obtained by treating styracin with potash—is the alcohol of cinnamic acid. Wolff* has recently converted this alcohol into cinnamic acid by oxidation, and now he has succeeded in proving that under the same conditions that ordinary alcohol is converted into aldehyde, styron is converted into the aldehyde of cinnamic acid or cinnamon oil. All that is necessary, is to moisten platinum-black with styron, and leave it for some days exposed to the air. Then, by adopting Bertagnini's process with bisulphite of potash, the double aldehyde compound may be obtained in crystals, which, after being washed with ether, are treated with dilute sulphuric acid, and the aldehyde of cinnamon oil thus obtained pure. The crystals are likewise dissolved by nitric acid.

The conversion of styrone into cinnamon oil by oxidation under the influence of platinum-black, may be represented by the equation:—

$$C_{18}\,H_{10}\,O_2 + 2\,O = C_{18}\,H_8\,O_2 + 2\,HO.$$

APPARATUS FOR GENERATING SULPHURETTED HYDROGEN.

Kemp† has contrived a very simple apparatus for this purpose, which may be easily constructed, and admits of the evolution of the gas being discontinued at pleasure. It consists of a tall glass jar, A, with a lateral tubulure near the top. B is a thick plate of ground glass, fitting air-tight upon the ground edge of A; in the centre of this plate is a hole to admit a cork, through which passes a copper wire, supporting a perforated leaden or earthenware basin D, for holding the sulphuret of iron. E is a washing-tube, fitted by a cork into the lateral tubulure, and the delivery tube is connected with it at F by a piece of vulcanized caoutchouc.



In using this apparatus, the cylinder is one-third filled with dilute acid, the sulphuret of iron placed in D, and the glass plate fitted on

* *Comptes Rendus*, xxxix., 61.

† *Chemical Gazette*, March, 1854.

tight with a little grease. When gas is required, the basin D is lowered into the acid by means of the wire C, and when a sufficient quantity has been obtained, it is again drawn up.

When large quantities of the gas are required, the basin D may be fully immersed, but only just below the surface, because then the solution of iron salt being denser than the acid, falls to the bottom of the jar and is replaced by the acid.

Baumhauer* has given a description of a similar apparatus, which is, however, less simple in construction. It consists of a wide glass jar, with a perforated shelf near the bottom, and a lateral tubulure, furnished with a stop-cock near the top. Into this jar fits a funnel with its small mouth below the shelf. The wide mouth of the funnel is covered with a sheet of vulcanized caoutchouc tied tightly on, and leaving a large margin.

The sulphuret of iron is placed upon the perforated shelf, and the funnel filled with dilute acid by the small mouth, then, while the finger is placed over the mouth, inverted into the glass jar, and the projecting margin of the caoutchouc tied round the rim of the glass jar. The generation of gas is of course determined by the opening or closing of the stop-cock belonging to the lateral tubulure.

A CINGHALESE REMEDY FOR CHOLERA.

We have received from Mr. Daniel Hanbury the following extract from a letter addressed to him by Mr. G. H. K. Thwaites, superintendent of the Royal Botanic Garden, Peradenia, Ceylon, under date 22nd August, 1854.

"You have probably heard that we have had a good deal of cholera here, particularly amongst the native population, though many Europeans also have fallen victims to the disease. Kandy has been visited by the pestilence two or three times within the last few months, and several deaths are now occurring here daily.

"Thinking it might be interesting to you and your pharmaceutical friends, I have been at some pains to learn the ingredients of a very celebrated Cinghalese remedy for cholera, and I now send you the recipe, with specimens of the medicines themselves. It is a curious mixture of things, and will give you some general idea of Cinghalese prescriptions. I am not able to identify some of the articles, but you will have little difficulty in doing so, I have no doubt." * * *

CINGHALESE RECIPE FOR CHOLERA PILLS.

Kirriabbin, Opium.
Cloves.
Nutmegs.
Mace.
Booloo, Beleric Myrobalans, fruit of *Terminalia belerica*. Roxb.
Araloo,† fruit of *Terminalia Catappa*. Lin.
Soodoo-handoong, White Sandal Wood.
Rat-handoong, Red Sandal Wood.
Ensāāl, Ceylon-Cardamoms, *Elettaria major*. Smith.
Tippilè, fruit of *Chavica Roxburghii*, Miq. Long Pepper.
Attana-àta, seeds of *Datura Metel*.
Kansāā-kola, leaves of *Cannabis* sp.
Cohōmba-àta, seeds of *Melia Azadirachta*. L.
Dewoolaatoo, gum of *Feronia Elephantum*. Willd.
Pairookāāyan, Assafœtida.
Sooddoodooroo, Cummin Seeds.
Kaloodooroo, seeds of *Nigella Indica*. Roxb.
Bin-dōōmmăle, a gum-resin dug from swampy places where there are no trees at present.

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* *Annalen der Chemie und Pharmacie*, xc., 17.

† *T. Chebula*. Willd., according to Piddington's *Index of the Plants of India*.

Lāākăda, gummy exudation from the growing points of *Gardènia latifolia*. Willd. and of other species.

Katookarosana, roots of ———?

Rhizome of Zingiberaceous plant?

Riddetoottang, a mineral chiefly composed of Carbonate of Lime, Magnesia, and Silica.

Sahindaloong, Rock Salt.

Pāāsāānang, White Arsenic.

Sāādelingen, Cinnabar.

Palmāānikkan, Sulphate of copper.

Equal weights of these ingredients, except of the arsenic, of which only half the weight is used, are pounded together with ginger, *gram*, and garlic, and on the following day with honey and the juice of the sour orange. The mixture is then made up into pills the size of a clove and dried in the shade.

Dose.—One pill for an adult, half a pill for a child.

Accompanying this recipe is a whole sheet of directions * as to how the pills are to be administered. They are given first with green ginger juice; if it is thrown up, sugar-cane juice is tried, and if this will not stay down cocoa-nut milk and white sandal wood are administered, and so on.

ON THE LAWS AND CUSTOMS REGULATING PHARMACY IN FRANCE.

BY MR. HOWARD HOPLEY.

Those who have observed the course of events, and the working of systems, will have found there to be a sort of turning-point in most things, in which men take a part, whence frequently important results take rise, and on which the future seems more directly to bear. This is seen even as much in the existence of a nation, as it is felt in the life of a private individual; but its influence is more commonly noted in societies of men, whether scientific or otherwise, connected with the general benefit or public opinion. It is on this point that the well-being of a society or system imminently depends, as here frequently very great results spring from comparatively insignificant causes, and mere trifles assume a double weight and importance, frequently deciding not only the fortune of a thing, but even its existence.

It may appear to some that the practice of Pharmacy in England has arrived at this critical period, and we look forward to the future with a curious but confident eye for its well-being; confident, knowing, that so long as civilization proceeds it can only be a question of time, and that it must ultimately take its rank in the proper place.

Society appears no longer able to endure the old schools, even in medicine, and though our good forefathers indulged in long-life pills and gout pills, and all kinds of patented medicines, and drank senna and salts, purchased at shops half grocer, half druggist, and were, some will say, none the worse for it, yet how many powerful and effective medicines have lately been discovered, and are now employed, which it would be, to say the least, unadvisable for an ignorant person to be allowed to prepare.

It can hardly be deemed that the contemplation of the laws and customs regulating Pharmacy in other countries will be unimportant, or that it will not be attended with beneficial results, where, seeing faults or failings, for, unfortunately they exist in almost every system, we may eschew them, and where discovering correct policy and good management, we may imitate and emulate them.

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* It was not received.—D. H.

The reader of the *Pharmaceutical Journal* will find, in the number for October, 1841, an article headed "Pharmacy in France," in which are given extracts from the Law of 1803, regulating Schools of Pharmacy in that country, and wherein it states through what grades an aspirant has to pass, and what learning he has to undergo, before he can attain the title of Pharmacien, or be admitted to exercise that profession to his advantage; also the pecuniary management of these schools is spoken of, that is, as they then existed. It will well repay trouble to turn back and read that article, for though several changes have occurred since then, it may be useful to examine why they occurred. The summary of that law is something as follows:—A young man who has received a liberal education, in proof of which he obtains a certificate of Bachelor of Letters (a higher grade is required now), spends eight years in the learning and practice of Pharmacy before he can pass the examination, he being at that time twenty-five years of age; except on extraordinary occasions—such as being son of a Pharmacien, &c. These eight years are passed thus:—Apprenticeship generally for two years—a short time apparently to us; but for the next three years, usually, no remuneration, except board and lodging, is expected for his services; and here let me say, that the Assistant in France is no less deplorably situated with regard to long hours and confinement than his brother in England. Unfortunately, it seems an established fact, that in all countries Pharmacy is equally tenacious of the time and liberty of her votaries. By the end of the fourth or fifth year he has acquired a good practical knowledge of most subjects, but particularly botany, which is a branch much attended to, probably on account of the extensive use of herbs in the French Pharmacopœia. If living in Paris, he avails himself of the beautiful *Jardin des Plantes*, where is found almost every herb and flower that grows, and which is open to all. During the last three years a certain amount of time is devoted to attending the schools and lectures, which are enumerated in the article spoken of.

When he wishes to pass the examination, a certificate from the school where he has studied must be produced, and from the Pharmaciens with whom he has been engaged; also an attestation of good morals and conduct by two householders and two legally received Pharmaciens. He will also have a certificate of his birth to show that he is twenty-five years of age. The school in its next assembly will deliberate on the demand of the aspirant, and if it judges the certificates satisfactory, will indicate to him when he will commence his examinations. (By this law examinations could be conducted by local boards, otherwise special juries, in the different departments of France, or at the three great schools; but by a decree passed last August the former are suppressed.) The examinations are three in number. The first two theoretical, one of which is on the principles of the art, the other on botany and the natural history of simple drugs. The third, practical, which examination continues four days, and comprises at least nine or ten chemical and pharmaceutical operations, named indiscriminately by the juries or school. The aspirant himself performs these operations, and describes the materials, the process, and the results.

To be admitted he must have the suffrages of at least two-thirds of the examiners. He then receives from the school or juries a diploma, to be presented at Paris to the Prefect of Police, or in other places to the prefect of the department, before whom he is required to swear that he will practise his art trustworthily and faithfully.

Should he be unable to pass he cannot present himself again for three months; if incapable of doing so the second time, he must wait a year.

The following is the form of diploma, according to the ordinance of 1840:—

"UNIVERSITY OF FRANCE.

"PHARMACIENS' DIPLOMA.

"We, ———, Ministering Secretary of State in the department of Public Instruction, Grand Master of the University:

"Considering the certificate of aptitude to the title of Pharmacien, accorded by the Director and Professors of the School of Pharmacy, Academy of ——— to Mr. ———, born at ———, Department of ———, the ———, considering the approbation given to that certificate by the Inspector General, exercising the functions of Rector to the said Academy:

"Give by these presents to the said Mr. ———, the Diploma of Pharmacien, that he may profit by the rights and prerogatives thereunto attached by laws and statutes, both of the civil rule and by the rule of the functions of the University.

"Done at the chief place and under the seal of the University, Paris, the ——

"The ministering Secretary of State of the department of Public Instruction, Grand Master of the University.

"By the Grand Master, exercising the function of Secretary of the Council Royal of Public Instruction.

"The Councillor to the Council Royal of Public Instruction exercising the functions of Chancellor.

"*Signature of Mr.* ———"

Thus it will be seen that Pharmacy in France is a profession, whereas with us it has frequently been but a trade, very little better than a mere selling of goods.

In another number I will enumerate the principal modifications that it has been thought necessary to introduce in this law, and which extend to last August; also several extracts from the decrees regulating the management of Pharmaciens.

7, *Titchbourne Street.*

HULL COUNTY COURT.

October 12, 1854.

(*Before W. Raines, Esq., Judge, and a Jury.*)

APOTHECARIES' COMPANY *v.* BROWNRIDGE.

Mr. DEARSLEY (instructed by Mr. J. J. Thorney) appeared for the Company, and Mr. Seymour, M.P., and Mr. Gresham (instructed by Mr. Todd) for the defendant. This was an action brought by the Apothecaries' Company against Mr. Brownridge, a Druggist in Mill Street, Hull, for having acted as an Apothecary without a certificate. The penalty according to the Act was twenty pounds. Mr. Dearsley having opened the case, and Mr. Seymour's objection as to the twenty-one days' notice being required having been overruled by his Honour,

Mrs. Ann Rutherford, wife of Thomas Rutherford, deposed that she had had a child, named John Rutherford, twelve months old. That on the 13th of February last, as the child was ill, and his complaint was, in her opinion, a cold in his teeth, she took him to the defendant, in Mill Street. When he saw the child, he said nothing as to what the complaint was. He gave her some medicine for him. She took him on several other occasions, but he got worse. The defendant said the child had a complaint that was prevalent, and that he was very ill, and he would look in and see him when he was passing. He called in twice. He saw him on both occasions, but he did not tell her to do anything, with reference to medicine, beyond saying that she was to fetch it. The child died on the 20th of February. A paper, signed by the defendant, was given to one of her neighbours, who was present. Witness paid him for the medicines when she got them.

Cross-examined.—Was only charged for the medicines when she took the child to the defendant. She said he had got a stuffing in the chest, and that he was not sufficiently ill to need a doctor. Asked for something to remove the stuffing, which was not serious enough to make her go to the expense of a doctor. The defendant gave her something, and said he would look in as he was passing by, and see the child, and she thanked him for his promise. Had had to get medicines from other Druggists before, and the charges made by them was the same as those of the

defendant. Mr. Dearsley said, that it was admitted there was no consideration for the visits, beyond the sale of the medicines thereby, but the point was, the defendant had acted without a certificate.

Re-examined.—Other Druggists did not come to visit her child at her house.

Mary Wharton deposed, that she resided at 15, Temperance Street. Was once present when the defendant visited the child. The certificate produced was the one she received, and which stated the cause of death to be inflammation of the lungs. She took it to the registrar's office, in Parliament Street, and registered the death there; did not get the child registered the same day. Went to the defendant to ask for the certificate.

In answer to his Honour, the clerk stated that the Act of Parliament said nothing about a certificate from a qualified person being required. There was a printed form for qualified practitioners, provided by the Registrar-General.

Tamar Gould, of 5, Success Place, Collier Street, deposed that, in August, 1853, she had two children, and one died on the 23rd November. Knew the defendant. One of the children had been ailing for some time, and when too ill to be taken to the defendant, he came to her house once or twice. After her confinement with the other child, in August twelvemonths, she took it in blankets to the defendant. Had got her medicine from him, and also from Mr. Lambert, another Druggist. She produced a bill, but it contained no charge for attendance.

Mr. Dearsley said he had eight or nine cases precisely the same as the others.

Mr. Seymour said he would admit them, and they were therefore not gone into.

Mr. Birch, clerk to Mr. Thorney, produced a bill signed by J. Brownridge, which he got from his shop. Took it from the counter; there were two or three hundred lying there.

Cross-examined.—Went to defendant to serve the notice upon him. Was not asked to take the bill.

Mr. Thomas Hodgson, printer's clerk, deposed that the bills were printed at their establishment for the defendant by his order. The bills when printed would go to the defendant. The bills set forth the excellence of a stomach restorative, which he alleged never failed to cure a disordered stomach, and contained these words—"The above question is one which I have put to me by at least two-thirds of the numerous patients applying for advice."

Mr. Seymour contended that there was no case to go to a jury, inasmuch as the defendant had never acted as an Apothecary, either according to the Act of Parliament, or to the common acceptation of the term.

His Honour decided that there was a sufficient case to go to the jury, and

Mr. Seymour accordingly proceeded to address the jury, arguing that his client had not violated the Act of Parliament, or done anything but what a Chemist was entitled to do. It was said that Mr. Brownridge had visited the witness's children; but if he did not charge for his attendance, and if he did not charge for the making-up of prescriptions, as an Apothecary was entitled to do, he contended that he had the same right as any other man to visit another's house through kindly motives; and the learned Counsel called

Mr. John Green, Druggist, of Barton, who deposed that he was in business prior to the passing of the Act in 1815—perhaps for two years. Before that year he used to visit persons when required to do so, and he then acted, in fact, as an Apothecary. He had continued so to act up to the present time.

Cross-examined.—There was a Surgeon in those days, and two Chemists in the town. Could not say that he charged for his attendance, and he thought he had a right to attend patients as well as Surgeons had. Did not know whether it was usual to make charges for attendance.

Mr. Lunn, Surgeon, was called by Mr. Dearsley to state his opinion. He deposed that he had been in practice since 1803. Before 1815 it was not the business of the Chemist, so far as he heard or knew, to visit patients. He did not believe it was the Chemists' practice before 1815 to visit as Apothecaries.

Cross-examined.—Did not recollect sending Mr. Wilkinson, Chemist, a notice not to practise as an Apothecary. Druggists were not, so far as he knew, in the habit of attending patients.

Mr. Seymour having replied on this evidence—

Mr. Dearsley replied on the whole case, commenting upon the conduct of the defendant in visiting his customers, which act was unfair, both to the other Chemists and the medical profession.

His Honour then summed up, recapitulating the evidence, and telling the jury, that with respect to the printed bills taken by one of the witnesses, they must put them from their consideration, as what occurred with respect to them was after the present action had been commenced. The Legislature had, he thought, acted wisely in restricting unqualified persons from acting as Surgeons or Apothecaries; but whether the defendant's conduct exceeded these restrictions it would be for them to determine. If their verdict went against the defendant the penalty inflicted upon him would be £20.

Verdict for the plaintiffs. Penalty, £20. —*Lancet.*

THE EARLY CLOSING MOVEMENT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Lewisham, November 16th, 1854,

SIR,—I have much pleasure in forwarding you a copy of the following resolution, agreed upon *willingly* by *all* the Chemists in this neighbourhood, as it tends to prove this fact, that if any good is to be done it must be by unity of effort and a determination to help ourselves.

I have always entertained the opinion that when in business, business alone ought to be attended to, and have much deplored that after the late hours of business incident to the Drug trade, the mind and body are generally too much fatigued for study.

I hope that the resolution that has been come to by the Druggists in this neighbourhood will be followed by others, and the long-disputed question of earlier closing be universally agreed upon, and prove the important fact that "Unity is Strength." I am, Sir, yours most respectfully,

THOS. H. LAVERS,
Local Secretary for Lewisham.

"NOTICE.—We, the undersigned Chemists and Druggists residing in Lewisham and Blackheath, having resolved to close our shops at nine o'clock in the evening instead of ten, as formerly, the public are therefore respectfully informed that this shop will be closed at nine o'clock in the evening, on and after the 20th November next. (Signed)

"W. C. ROE
C. B. MILLER
J. B. CAPPER
WM. THOS. ASHWIN } *Blackheath Village.*

THOS. H. LAVERS
EDWARD CLEFT } *Lewisham.*"

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I think too much publicity cannot be given to any advance in the early closing movement.

Convinced that our long hours of business can be shortened without any loss, if not with a positive gain to ourselves, I have been at considerable pains to bring about so desirable a result in this locality.

I may call this a late neighbourhood, but my mission has been so far successful, as to induce the Chemists in New Cavendish Street, Great Portland Street, Upper Marylebone Street, London Street, Cleveland Street, and others adjoining, to close, on and after the 27th of November, at ten o'clock every night, Saturday excepted, and from eleven A.M. to six P.M. on Sundays, and I have no doubt in time we shall effect a still further curtailment on these hours of business. Trusting to find the same spirit animate others, I am, Sir, your obedient Servant,

J. WALLIS MASON, M.P.S.

45, *Upper Marylebone Street, Portland Place, Nov. 18th*, 1854.

WE have received a copy of a Circular issued by MR. PETER JONES, of Norton Folgate, stating that "it is his intention to close his establishment, on and after the 1st of January next, at eight o'clock in the evening, instead of ten o'clock, as at present.

"He is induced to make this change, even at the risk of pecuniary loss, for the purpose of affording to those in his employ opportunity for mental culture and physical relaxation—a privilege at present all but wholly denied to the Assistant Chemist.

"He is convinced, by an experience of more than twenty years, that the responsible duties of the Pharmaceutical and Dispensing Chemist will be more efficiently discharged, and with *greater safety to the public*, by those young men who have a portion of time at their disposal for the important purpose of acquiring such knowledge as pertains to their profession, than by those whose energies are daily exhausted by incessant toil, and who are thereby precluded from even the bare possibility of improving their minds.

"With due regard, however, to the convenience and necessities of the public, it is necessary to state that, although his shop will be entirely closed at the above hour, either himself or a competent Assistant will *always* be at hand, by day and night, for the purpose of attending to all cases of *emergency*."

We are obliged to postpone Mr. Bradley's communication.

BOOKS RECEIVED.

On the Peculiar State of the Atmosphere during the Progress of the late Epidemic, Cholera and Diarrhœa. By Thomas Pollock. London: John Plummer. 1854.

A System of Instruction in Quantitative Chemical Analysis. By Dr. C. R. Fresenius. Edited by J. L. Bullock. Second Edition. 1854.

The Use of the Blowpipe, &c. By Professor Plattner and Dr. S. Muspratt. Third Edition. 1854.

TO CORRESPONDENTS.

Dispensers in the Crimea.—Several Correspondents have enquired through what channel they should apply for appointments as Dispensers at the Crimea. These arrangements, with others relating to the Medical Staff, are under the direction of Dr. Andrew Smith, St. James's Place.

A. P. S. (Northampton).—The quality of the gas would be the same in both cases.

H. F.—In reference to the paper on Ozone, by Professor Schönbein, suggests that the well known sudden ripening of corn (*i.e.*, bleaching) after a thunder-storm may be possibly due to the liberation of ozone.

J. T. (Bath).—(1.) The two works mentioned are similar in character. Either would answer the purpose. (2.) No.

E. B. (Atherston).—*An Apprentice* (Northallerton).—These questions have been answered repeatedly. See vol. xii. No. 7. The prices of the works referred to are as follows:—Fownes's *Manual*, 12*s.*; Gregory's *Handbook*, 12*s.*; Pereira's *Elements*, £3 6*s.*; Royle's *Manual*, 12*s.*; Lindley's *Elements*, 12*s.*; Lindley's *School Botany*, 5*s.*

J. M. (Tulse Hill).—Boiling water, with soda or potash.

Walter.—Horne's *Handbook of Photography* would probably answer the purpose.

A Reader (Burnsley).—Hoblyn's *Dictionary of Medical Terms*, &c.

Enquirer (Mile End Road).—(1.) Camphor ball is considered as a cosmetic, unless recommended for the cure of any disorder which would make it liable to stamp duty. Chapped hands would, properly speaking, come under this definition. (2.) Chemists are not specially exempted from serving in the militia, &c. (3.) We think not. (4.) We hope it will be settled soon, but cannot say when.

W. S. (Madelers).—We know not the composition of Sibley's Solar Tincture.

J. A. (Coventry).—The General Index is in a forward state. We hope it will be completed about the beginning of the year.

A Subscriber (Loughboro').—We are not able to give the formula for Stolberg's voice lozenges; but black currant lozenges, with tannin (about ½ ounce to 2½ lb. of the mass), are sometimes found useful. A small quantity of Cayenne may be added.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. VII.—JANUARY 1st, 1855.

LATE HOURS OF BUSINESS.

The advocates of early closing have made a fair start; they must not flag. The first step was taken under the encouraging influence of popular excitement—the test of sincerity is at hand. We have published copies of several notices to the public, announcing the intention of the undersigned to close their shops at a certain hour on and after a day specified. Three notices of a similar nature from other localities are published in this number, and if we may judge from rumours afloat, we may infer that the disposition to shorten the hours of business is gradually spreading far and wide.

But the agitation has ceased. The movement is discussed in conversation as a mere matter of business, and an occasional advertisement informs us that fresh converts are joining the ranks, and reminds us that the subject is not forgotten.

We do not infer that the cause is not progressing where no public notifications are issued, as we know that many persons act upon principle, and without bringing their names prominently before the public, adopt that which their judgment tells them is right, and which reflection has convinced them is practicable. When this is the case, we have more faith in the permanence of the resolution, than we should have had if the change had resulted from an arrangement between a number of individuals residing in the same district, the validity of the compact being conditional upon the mutual good faith of all the parties concerned. In this latter case, the disposition to watch each other has a tendency to weaken the self-control and independence of action, from which a consistent adherence to the resolution might have been expected. An accident (such as the absence or the negligence of the porter) may cause one of the parties concerned to deviate from the terms of the compact, and if this compact be based on the condition that it is to be strictly observed by all, such an accident may be interpreted as a breach of faith, and held to exonerate the other parties from their engagement. We have heard it stated that this has been the case in one district in which a notice (published in a previous number) had been circulated, and we mention the subject now, because experience in former years has shown that this is the rock upon which early closing arrangements too often fall to pieces. Making every allowance for the influence of competition, and the instinct of self-defence, we think the display of eagerness to secure the last stray customer at night, arises from a mistaken policy, and that the man who closes his shop at a regular hour, according to the dictates of his deliberate judgment, and adheres to his resolution when thus formed, is likely in the end to gain more than he loses.

Those who publish notices, and afterwards swerve from the stipulated regulations, are likely to injure themselves, by giving rise to an impression (however erroneous it may be) that they were influenced, not so much by the desire for early closing as by the opportunity of issuing an advertisement.

We have received several communications on this subject, in some of which, although written professedly to promote a curtailment of the hours of business, the writers find fault with the mode in which the arrangements are made, and suggest amendments which we think calculated to raise differences of opinion, and thus frustrate their object.

Desiring, as we do, to see early closing generally adopted, and being convinced that this reform in the late hour system can only be introduced gradually and by voluntary means, we think it better policy to dwell chiefly upon that which is obviously practicable than to court opposition, by raising disputes on matters of detail.

We quote the following from a letter of a Correspondent:—

"I cannot see the philosophy of excluding Saturday in the general arrangement, when I observe the Chemists with the door shutters down on Sunday morning, equally as accessible for the supply of goods as on any other day. In the name of common sense, why remain open later on Saturday night for the supply of Sunday medicines, when the shop is open the next day for the same purpose?

"I see it is agreed by Chemists in some quarters to close their shops on Sunday morning at eleven, and open again at six P.M. This seems an extraordinary procedure, and tells the public by no means to be ill between these hours, as the supply of medicines would be doubtful."

The remainder of the letter is to the same effect, pointing out the propriety of entirely closing shops on Sunday, and writing on the doors "medicines may be had at all hours by ringing the bell," or words to the same effect.

Another Correspondent objects to this plan, the incompleteness of which he considers calculated to defeat the object of the alteration. He says:

"A number of Druggists agree to close their shops at nine instead of ten or eleven P.M., and to shut up on Sundays, but from some feeling, it may be uncharitable to call it acquisitiveness, some of them are so fearful that the public should be inconvenienced, that they deem it necessary to put a tablet on their shutters, with the humble statement that 'medicines may be had at all times by ringing the bell,' or, 'although the shop is entirely closed, the principal or a competent assistant will always be at hand by day and night to attend to cases of emergency.' Now it is obvious that this farcical intimation of 'closing and not closing,' cannot produce the desired effect, and particularly upon those who have no assistant to share in their labours, who have no opportunity of taking air, exercise, nor other relaxation. This class, the one most susceptible of improvement, is worse off than before; must either sit at home, for the bell ringing for hair-oil or some such trifling article, or leave home at the risk of customers being accommodated by some watchful neighbour."

It is, indeed, impossible to frame any regulations to suit all parties. The cases of those who keep no assistant are the most difficult to deal with. We think, however, that these are exceptions, and not the rule, and it is scarcely reasonable to expect, that those who keep assistants will leave their shops deserted in the evening, and on Sundays, because some of their neighbours have none.

The necessities of the public must not be forgotten, and as illness may come on at any hour of the day or night, those whose duty it is to supply the remedies must endeavour to be prepared for any emergency. At the same time, the shop may be closed at a reasonable hour in the evening, and throughout the Sunday, without any inconvenience to the public, and, we think, without loss to the Chemist, provided it be understood that medicines may be obtained at any time in case of need.

STENOGRAPHIC PRESCRIPTIONS.

We apply this term to prescriptions containing private formulæ, or written in such a manner as to be understood only by those who have received instructions from the prescriber.

We have on a former occasion alluded to the purposes for which such prescriptions are written; namely, First, As a matter of necessity, when the medicine prescribed is a new remedy, or one not generally known. Secondly, As a means of enabling a prescriber to secure the patronage of his patient in favour of a particular Chemist, from whom he receives a percentage. As we remarked in the article above referred to (vol. x., No. 3, page 107), collusions of the latter description between medical men and Chemists are disreputable and dishonest. No respectable Physician or Surgeon would degrade himself by

entering into such a compact, and a Chemist would deservedly lose the confidence of the public if it were discovered that a fee to the doctor was included in the amount professedly charged for the medicine. No little inconvenience arises from this mode of transacting business, for when such a prescription is taken to a Chemist who is not in collusion with the prescriber, and who acknowledges his inability to prepare the medicine, he is liable to be suspected of not understanding his business; and a Chemist who prepares at random a prescription written in indefinite terms, incurs the risk of furnishing medicine differing from that which the prescriber intended.

The Pharmacopœia is the medium of communication between the prescriber and the dispenser, and, as a general rule, prescriptions should be written with reference to that authority, or expressed in such terms that any qualified Pharmaceutical Chemist can dispense them accurately. But medical science being progressive, and new medicines or preparations being introduced from time to time, the Pharmacopœia, of which a new edition appears at uncertain intervals, does not contain all that is required by those who take an interest in the advancement of their profession.

The general practitioner, whose prescriptions are prepared in his own dispensary, has the opportunity of testing the efficacy of new remedies or improved preparations without the liability to error from his instructions not being understood. Physicians and Surgeons do not possess these facilities at home, and therefore require the services of Pharmaceutical Chemists in such cases. Whether they desire to suggest an improvement in a preparation, or to try the effect of one introduced by a Chemist, and which in either case they think likely to prove beneficial to a patient, they have no alternative but to direct the patient to the place where the medicine may be procured; and if the medicine be one which is not generally known, or which is the subject of experiment suggested by the prescriber, he must take precautions to secure to the patient the due performance of his instructions. A prescription written under these circumstances comes within our definition of a stenographic prescription, and in such cases, which may be quoted as exceptions to the general rule, the inconvenience attending it is a necessary evil; for the conclusions respecting the value and efficacy of the preparation under trial would be altogether fallacious unless due care were taken that the medicine furnished to the patient was actually that which was intended.

Such experiments in pharmacy are not only legitimate but necessary, and some of the most valuable preparations in the Pharmacopœia have originated in the careful investigations of medical practitioners aided by experienced Pharmaceutists. During the progress of these investigations the inconvenience above referred to may be greatly diminished by the publication of the formula or process as soon as its value is sufficiently established by the results observed in practice. Whenever such information is within our reach, we take the earliest opportunity of publishing it; but it sometimes happens that a preparation (such as Battley's Liquor Opii, for example) acquires celebrity in the profession, and the maker declines to publish the formula. When this is the case, or when a medical man wishes to prescribe any preparation not generally known, it should be stated on the prescription where the article may be obtained, by which means any Chemist is enabled to procure it and dispense the prescription correctly.

Mystery or concealment, in regard to the nature and composition of medicines ordered in prescriptions, ought to be discouraged and avoided as much as possible. It may be considered desirable to delay the publication until the preparation has had a fair trial, and even after its merit is established, the discoverer of the improvement *cannot be compelled* to make known for the benefit of the public that which may have been the result of much labour and expense in the preliminary experiments. He may, as some persons do, prefer to retain the exclusive manufacture of the article for his own benefit until he has been

remunerated for his skill and experience: and if during this time medical men thinkproper to order the preparatiou, they are free agents, and may use their discretion. There are some persons who deny the right of a medical man to recommend one Chemist in preference to another. The time may arrive when the diploma of the Pharmaceutical Society will be a guarantee of the skill and accuracy of the possessor, and when medical men may feel full confidence in entrusting any prescription to any Pharmaceutical Chemist. It is our earnest desire to promote and expedite this successful result of the establishment of the Pharmaceutical Society. But the time will never arrive when it will be an offence to recommend any person, who, by his skill and integrity, has acquired a reputation in any business, or in the manufacture of a particular article of consumption. Some persons recommend Bass's pale ale, others prefer Allsopp's. Bass and Allsopp may vie with each other in the quality of their pale ale, but each must stand or fall by his own merit tested by public experience and opinion.

The Pharmacopœia Committee will afford facilities for the introduction and early publication of improved processes, and this will tend to place within the reach of all the profession the latest information respecting new medicines. We hope the subject will receive that attention which it deserves, and we think advantage would arise from the occasional publication of a SUPPLEMENT TO THE PHARMACOPŒIA during the interval of eight or ten years which usually intervenes between the editions of the entire work. This would, to some extent, obviate the inconvenience of stenographic prescriptions, by affording an official medium of communication between the prescriber and dispenser, through which channel new or improved remedies would be promulgated. But even this would not remove the necessity of occasionally calling in the aid of Pharmaceutists, or deprive medical men of the right to do so, when making trial of medicines not yet recognized or generally known.

THE PHARMACEUTICAL MEETINGS AND THE PHARMACOPŒIA.

THE list of substances comprised in the Materia Medica is the subject officially before the Pharmacopœia Committee. It is the most heavy part of the work—that is to say, it is the portion least likely to excite interest among the Members at large. It may be compared to the alphabet, which is the foundation of a language, but which, to all except the learned analytical grammarian, affords no scope for enthusiasm. The list of Materia Medica is almost ready for publication, and will be forwarded to the Members in different localities, with a request that information may be furnished to the Council respecting any substances which may have local celebrity, although not contained in that list, with such other suggestions as the Members may be able to give. The revision of this list will occupy considerable time, and as it was thought undesirable to delay the consideration of other parts of the work, several subjects have been introduced at the meetings for the purpose of taking advantage of the present season, and collecting information which may be useful hereafter.

We may observe, that in these discussions it would scarcely be practicable to adhere strictly to the order in which the several subjects appear in the Pharmacopœia. Each subject as it arises is introduced by means of a paper or some remarks founded on the practical experience of the author; and as long as a supply of materials for discussion is thus spontaneously offered, we may consider that some progress is being made, and the result will be available at the proper time. As the Pharmacopœia Committee proceeds in its labours, it is probable that subjects requiring investigation will be especially introduced with a view of obtaining the assistance of the Members. The field of research is wide enough to occupy the attention of the Society for a long time to come, and if each Member will contribute the result of his experience, on any subject to which he has given particular attention, the materials thus accumulated will form the groundwork of an improved Pharmacopœia, which is the object to be attained.

UNITY OF PURPOSE.

The united efforts of a large number of persons, when directed to a good object, and conducted in a proper spirit, will often bring about results, even exceeding the original expectations of the parties concerned. But in order to ensure success unity is essential, and minor differences must be merged for the general good.

When the object to be attained is of an ephemeral nature,—such, for example, as the repeal of an obnoxious law, &c.—a vigorous and simultaneous effort, a concentration of all the energies in the one undertaking, for a limited period, is all that is required. In such cases the excitement of the moment sustains the courage and keeps up the interest of the party, and each successive step in advance "adds fuel to fire," attracting fresh supporters, and encouraging those who originated the movement.

But when the object in view relates to education, and the advancement of the social and intellectual qualifications or professional status of the members of a profession, a steady, continuous, and uninterrupted course of proceedings is necessary for a long series of years. The charm of novelty may stimulate for a time, and when this evaporates, it leaves a vacuum in the minds of the many, which must be compensated for by the redoubled exertions of the few; and unless there be some zealous advocates of the cause who go steadily forward, neither dismayed by discouragement, nor elated by success, but intent upon the ultimate object to be attained, the most favourable beginning may end in disappointment, and the time and labour may be wasted.

The Pharmaceutical Society has afforded a practical illustration of these remarks. Its origin was attended with an amount of success which surprised its most sanguine supporters. It has, like other institutions, undergone a variety of reverses and intervals of prosperity. Some of its Members have continued steadfast in the cause, through evil report and good report, they have kept the desired ultimatum constantly in view, and used all their endeavours to encourage their brethren. Some have become lukewarm and retired; new Members have been added to the list, the influence of the Society has spread throughout the kingdom, and branches or local associations have sprung up in aid of the general undertaking.

The North British Branch of the Society is in the ascendant at the present time. Its meetings are well attended by the Members, and by members of the medical profession. The paper by Professor Christison, in another part of this number, and others previously published, afford encouraging evidence of the interest which has been awakened in the profession, by the progress of Pharmaceutical education. Efforts have been made to establish scientific meetings in Glasgow, but the accomplishment of this object must be a work of time.

The Liverpool Chemists' Association is also flourishing, and although this is an independent institution, it is an auxiliary to the Pharmaceutical Society, and calculated to promote the same objects.

In Manchester there are two Associations, both tending to the same end, the encouragement of progress in the art and science of Pharmacy. Lectures are delivered, and meetings are held, for the discussion of scientific subjects. If these two Associations were amalgamated into one, we think they would produce a more salutary effect, as one course of lectures might be established on a more extended scale, and the union of the two classes would enable the professors to convey the same amount of instruction at a less expense. These arrangements, however, must rest with the parties more immediately concerned, and we make the remark by way of suggestion, having been informed that it was in contemplation at one time to unite the two societies, an event which we hope will sooner or later be accomplished.

The local Society at Birmingham is at this time rather depressed. The meet-

ings have not been so well attended as they were formerly, and the number of Members who take an active part in the proceedings has diminished. Nevertheless, we hope the true friends of progress will not be discouraged. Birmingham enjoys facilities for improvement. The population, that is to say, the pharmaceutical population, is large enough to support a flourishing Society, and we trust the present discouraging aspect of affairs is only temporary.

In Bristol and Clifton we have some active and zealous Members, several of whom have received their professional education at the School of Pharmacy in Bloomsbury Square, and although we have not of late received reports of meetings and lectures from that quarter for publication, the elements exist from which we hope the Society will derive an accession to its collective influence. At Norwich, Leicester, Exeter and Plymouth, branch Associations have been formed, but some fresh stimulus is required to revive and re-establish the proceedings.

The Pharmaceutical Meetings in London are carried on with renewed spirit. The revision of the Pharmacopœia has furnished materials for discussion, and as these subjects are interesting to the Members generally, the Meetings have been, and we trust will continue to be, well attended. The School of Pharmacy is progressing favourably, and although the class is not so numerous as it ought to be when the importance of its functions is duly considered, the practical instruction which it affords is producing the desired effect, and adding to the list of qualified Pharmaceutical Chemists. Every year will raise the value of the diploma and consolidate the influence of the Society. The legal proceedings have retarded this progress by placing in abeyance the powers of the Council, as the executive by whom the provisions of the Act are to be enforced, and also by causing doubts and disaffection in the minds of many who would otherwise have been promoters of the cause, either as Members of the Society or candidates for the certificate of the Board of Examiners.

From the brief sketch above given it will be seen that the Society is steadily progressing in strength and influence—that its ramifications are producing a salutary effect in various localities, and that a general tendency prevails to advance with the times, and to raise the professional status of Pharmaceutical Chemists.

This progress is not uniform and uninterrupted in each locality. Fluctuations and periods of depression always occur in such cases; but while discouragement may exist in one branch, renewed activity prevails in others, and on a general review of the whole there is every reason to believe that the Society is established on a sound foundation, and that the perseverance of its unflinching supporters will, in the course of a few years, place the Pharmaceutical body in a position creditable to its Members, who by their increased efficiency and usefulness will confer a great benefit on the public.

The commencement of a new year appears to be a suitable time for taking a survey of past proceedings and progress, and in so doing we take the opportunity of reminding our readers, that unity among ourselves is our main source of strength, and that unless we can work harmoniously together in the important undertaking in which we are engaged, we cannot reasonably expect to enjoy the respect and confidence of the public.

ASSOCIATION.

BY MR. JOSEPH INCE.

An old man drew nigh to death. Like many another worthy parent before his time and since, he had nothing to give his children but good advice. Gathering them round his bed, he bade them each in turn take up a bundle of sticks which lay close by, and try to break it. It is well known the attempt

was useless. "Now," said the expiring moralist, "untie the bundle and observe what happens." They did so, and the twigs, once separated, broke with ease; a lesson to succeeding generations of the power of union, from which too has been derived the minor axiom, that even sticks do something when together.

A new year has opened—may it be a happy one! There are epochs which arrest every man's attention—the first of January is one. If a man has an idea at all, he has it on this day: accounts are settled, the books are balanced, and the old year is left behind for ever. But the excitement of novelty soon ends; the past suggests often no improvement to the present, likely itself to issue in an unaltered future, until in due course the same monotonous round of duty leads gently onward no few Chemists to December.

There is an impression, to which circumstances lend a colouring, that there is something in the business of a Pharmaceutist which contracts and limits energy. That his daily occupations are so divided, and so harassing, as to exclude all scope for enterprise; consequently, while every other branch of trade can show its public men who have distinguished themselves in the humanities or various social interests of the age, the Chemist, with rare exceptions, rests sepulchred in his one pursuit, content if a steady routine of customers saves him from the fear of bankruptcy, but not particularly ambitious either to enlarge his own sphere of action, or to shine in that of others. Granting as much of this as may be true, one point must be conceded. There is exerted in the humblest Druggist's shop, an unwearied and continuous application, an anxious superintending care, an unbroken concentration of both manual skill and thought, capable in themselves of effecting anything, and which applied to any different undertaking, mercantile or otherwise, would lift it to the ranks of a great enterprise. It cannot be want of energy, still less want of skill, that keeps the Chemist as he is. No; one thing fatal to his interest prevents him from advancing, that is, he stands alone. He works *by* himself, therefore lives *to* himself, nor will he ever be able to make use of his own capabilities, and stand on a level with his fellow-men, until he feels, and knows, and acts in accordance with the power of Association.

From early childhood we have had a nervous horror of long sermons; so hasten under this wholesome fear to give two illustrations of the effects of unassociated Chemistry.

An honest youth, having escaped the immediate woes of infancy, is sent to a good grammar-school where he learns English, French, and Latin. He grows up, and looks genteel. His father and mother think him no common child, for he has a distinguished air with pleasant manners. Let other rough-trained, ill-educated boys be linendrapers or cheesemongers, our son has got intelligence, let him be a Chemist. Away go the anxious parents, and pay about £300. The new apprentice has enthusiasm, reads himself to sleep, and dreams of Faraday. The morning brings the disheartening contrast of the reality. Washing out bottles, cleaning windows, mixing paint, consume the lingering day. Time wears on, so five years make him an Assistant; but in all his occupations, though their name is Legion, he fails to trace the connexion between any one of them and Chemistry, nor can he for a moment solve the reason that induced his too confiding parents to pay so much, for him to gain so little. However, this he thinks, perhaps, is country life, therefore with new hope he tries a town, where the same fate awaits him with less out-door exercise, and a shade more smoke. *Nil desperandum*, London is the promised land! There Science grows spontaneously, Success waits at the cab door; benevolent employers shake latent genius by the hand, and take it to the Royal Institution every evening after business hours. No scenes of dissolving bliss at the Polytechnic vanish sooner than the strange illusion—a week all toil, and a Sunday all hair-oil, are its most striking features. The food bears not unfrequently an inverse ratio to the work, while the unwelcome night-bell

disenchants the scanty rest, that is snatched at intervals as may be, in a chamber where the bottles are the curtains.

Ah! sighs the disconsolate Assistant, if I *was* so intelligent, why was I not made a lawyer; or, failing that, a grocer? But he is wrong, for in his misery he knows not that he has simply fallen into an establishment where they sink Pharmacy into a mere trade, than which, *as such*, nothing is less attractive or more odious. It has proved a comfort to us in less happy moments, to remember that we have rescued more than once an unwary applicant from such catastrophe.

A second view into the interior will show that this isolation system reacts as fatally on the master as the man. You very well know the old corner shop, with the Phœnix in the middle pane, and placards in the window: there it has stood for years, just as it used to stand. The same horse indicates a care for animals, the same capsules of a date unknown attract the public gaze. Within there is another specimen of the days of yore—the Principal. He never has been young, for he adds to his own account the hereditary age of the establishment. His father lived in the same house, and his father's father: what they did he does—he buys and sells the same; he thinks and speaks the same; he bows and smiles the same, and despises other people just as much as they did. Indeed he has a peculiar reverence for the ancients; their mantle, nay, for aught we know, their identical white apron has fallen on him.

The world has turned right round since then, but he objects to turn round with it. What then? Can it be possible? Yes, so it is! upstart concerns, which have neither a horse nor capsules in the window usurp the field, and breathe a language, darkly unintelligible of steam and vacuum apparatus, and last absurdity, have positively dragged Chemistry into a Chemist's shop. The world gives them its confidence notwithstanding, while by some mysterious influence the old house loses its old prestige. Our ancient Chemist, who is not to be caricatured but pitied, vainly struggles on: expenses multiply, provisions rise, and even omnibuses inform us, children must be paid for. Therefore the Phœnix rises from its ashes at half-past six precisely, to sleep we know not when. The anxious manager, a living sacrifice, throws his whole soul, his health and strength, and all the little mind he has, into his dreary work. The entire aspirations of the man being bounded northward by the shop-door, southward by the back counting-house, and east and west by the surrounding bottles, some of which are very small. No pleasure from without invades him, no ray of happiness from any other spring but physic lights his dwelling; he would die rather than steal an hour from his companion drugs, and with all due deference to him and his private views, we do not think that life worth living that is spent thus.

One thing distinguishes our fossil Druggist—he has invariably some wonderful Elixir, destined to cure the ills that flesh is heir to, by just looking at the cork. It is his daily trouble to conceal its mode of preparation—the head Assistant knows it, who on leaving tells it to the junior, who in a convivial moment gives the secret to the errand-boy, who in his turn imparts his knowledge to the servant maid.

The mystery is not a great one, for it has been for years embalmed in Beasley's Formulary, but the house never deigns to know what other people do. This is a dark eventful period for the old gentleman, who has by this time fallen back on soap and sundries, relieving his few spare moments in a guerilla war with his Assistants, for the young men have got to know almost as much as he does, and prepare things better; nay, one presumptuous individual, who in an evil hour had been elected as a worker in the *sanctum*, whispered a novel plan of making the elixir. "Sir," said the irate unchangeable, "the ancients made it just as I do. I hate your new improvements, your journals where they put down everything in print, your apparatus, and your evening lectures. I have

made up my mind on principle to alter nothing. There is a Committee, I am told, for the revision of the Pharmacopœia. Nobody made anything by it, Sir, when I began, nor do I now, but buy things wholesale from the City. If, as you say, I burn my extracts, and make no difference between Taraxacum and Extractum Glycyrrhizæ, it is not for *you* to speak. My fathers used to burn them, Sir—the way of the house allows no interference. I would say more, but I am tied to time. Mrs. Smith's pills are wanted by eleven, and you leave, Sir, this day month."

Not very long ago, a few courageous Chemists, led by the spirit of an advancing age, thought they could brighten the dreary prospect by good-will and mutual intercourse. They sought to link its barren details with legitimate applications, to let the light of modern Chemistry into their various processes, to save both themselves and their assistants from the drudging weariness of mere manual labour, to gain the full advantage offered by the rare appliances of science, to allow the daily tide of business to extend itself by simply running into the channels shaped out for it by discovery, to enjoy an honourable and just position, and live in the consciousness that their reputation hung not upon the sorry thread of a few private recipes which any charlatan could imitate or pirate, but on the accurate knowledge of their own immediate business, added to that calm, unostentatious self-possession which a well-grounded liberal cultivation can alone bestow.

For this they created an Association. They knew not from tradition, but from sad experience, the actual loss, to say nothing of the burden of the solitary system. Hard it must have been at first to submit to other than accustomed influences—to sacrifice a sort of personal independence and to admit unusual agencies into ordinary trade. A right judgment won the day. Cavillers were not wanting then as now who looked with suspicious jealousy on any movement that led one shade beyond routine—to them all change was odious, progress of any kind absurd. Nor did others fail to think, or thinking, to express their strong opinion that private formulæ and specialities were the Chemist's only safeguard, and that to adopt another, though a better system, would entail their ruin. But more than all, inveterate ancients considered in their quiet minds that Science would upset their occupation, whilst nervous Pharmaceutists feared they would gain little and perhaps lose something by talking to other people.

To their honour, the Founders of the Society we now possess, uninfluenced by these worthies, steadily worked out their own ideas. Men got to know each other, and as a consequence, found out each other's individual wants, for there is more philosophy in tea and toast than the general world supposes. Schools rose, lectures were given, books were read and laboratories built. The old system vanished—the new one which succeeded was not only so much better, but so far more profitable, that its original advocates were accused of interested motives, until attracted followers found it as much *their* interest to unshroud their faculties and share the Union.

Some, we are well aware, think all such reasoning foolish, mere phrases written for an article, meant to read. They would survive the crisis that consigned the Society, with its supposed advantages, to its last repose. Their shops would open just the same, their custom flourish, although perhaps denied the heaven of intercourse, and kindred flights of the imagination. Be it so—have your own way, most thorough man of business, and without let or hindrance buy your physic, vend your patent medicines, cachoux, soaps, pickles, miscellaneous articles, with choice selections from the neighbours' trades. You get a premium from apprentices, who stand and view your operations, feeling their minds improved. So far so good; but did it ever strike you what an amount of real labour you are obliged to throw into a day's work to get a living? One well-made chemical, one clever adaptation, certainly one single branch of applied modern Science would take one-half the time and yield at least double profit.

At public meetings you confess yourself that early closing is impossible, for even Sunday is measured out in penn'orths. Gratuitous is all such information; —we only say, why do it? You cannot, of course, shut up with such an endless occupation. A man must slave like Hercules, whose hand does all the work. Try intellect. The Patriotic Fund, we fear, has not received your contribution, for a good reason, that you cannot yet afford it. How should you, when your various articles are bought, not made? which is expensive. Reform your Druggist's bills.

Having rejected Chemistry, each new-born product is purchased at a far dearer rate than knowledge, and leaves you a prey to every gentleman who tries to cut out a living with the Lancet. Allow the Society the full benefit of all the scorn that can be heaped upon it, still the bare interest of trade decides that the old plan is the dearest, the least profitable, and the hardest.

The opening year claims our attention for an instant to another theme. The equal mind that views all things alike is not a possession to be envied much. Right it is, on fit occasions, to exult in the advance and genial influence of Association; it is right, also, to pay a passing tribute of respect to those who are no longer left to aid its councils, or promote its welfare. May we be allowed to remind the reader of a bygone scene, for the attractions of the present Evening Meetings should not allow us to forget the past.

On the 9th of October, 1850, a more than usual number were assembled for discussion in Bloomsbury Square. The Chair was taken by one whom the writer of this paper held in higher reverence than any other living man. The question before the Members was the use of the Sulphite of Lead for the refining Sugar. The speaker, on that occasion, was the late lamented Dr. Golding Bird, whose early death has furnished another illustration of the seemingly fatal union of a brilliant with a short career. It surely is not irrelevant to notice one who, in his lifetime, thought it no dishonour to be the Chemist's friend. All who were present will remember well the tall, attenuated, singularly graceful figure; the easy self-possession, the choice, unhesitating diction, that oftener indicate the cleric than physician. His life was the commencement of a scientific treatise, masterly but unfinished. When young he taught his schoolmates Botany, chose medicine as his own profession, and in due course entered at Guy's Hospital, where he was, subsequently, first chosen lecturer on Natural Philosophy, then Medical Botany, and lastly Materia Medica. He lived some time in Islington, the nicest place we know of, with the nicest people; then removed to Russell Square. During his whole course he gave himself up to study, Electricity and Natural History being his lighter amusements—such recreation injured him so little, that latterly his annual income was £6000. It is not for us to judge the questionable wisdom that prompted him to read all through the night, as often was the case, and yet attend his practice, for constitutional impulse brooks no rules. Few ever dream of the exhaustive process which produces our great men.

The lesson taught us by his bright example will not be easily forgotten. If one so eminent deemed it no loss of time to walk in paths of knowledge some might think superfluous, the Chemist cannot hesitate to do the same. The business of the latter has been called a living tomb, at least let his grave be decked with flowers.

And now the eloquent speaker, the skilled practitioner, the devoted Christian is at rest. He died aged thirty-nine. His earthly work is over—the chairman and his visitor are gone to share alike in an Association, higher and nobler, and eternal.

31, *Southampton Street, Covent Garden.*

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR,

Wednesday, December 6th, 1854.

EARLY CLOSING MOVEMENT.

On opening the meeting, the Chairman read the following resolution of the Council, which had been passed that morning:—

Resolution of Council, *Dec. 6th*, 1854.

"*Resolved*—That the Council have heard with pleasure of the arrangements made in many places to shorten the hours of business, and, while they feel that the requirements of various localities are so different that no general rule can be laid down, they recommend to all Principals to adopt them as far as practicable, so as to afford to their Assistants and Apprentices increased opportunities for mental improvement."

Donations to the Library and Museum were announced as follows:—

The *Medico-Chirurgical Transactions*, vol. 37, from the Medico-Chirurgical Society.
The Chemist, from Mr. Highley.
The Journal of the Society of Arts, from the Society of Arts.
The Journal of the Photographic Society, from the Photographic Society.
The Literary Gazette, from the Publisher.
A specimen of impure Cinnamic Acid, from Mr. George Whipple.

Mr. Whipple stated that the specimen of cinnamic acid which he had presented to the Society was obtained from balsam of tolu. It was discovered many years ago that the acid in balsam of tolu consisted partly of cinnamic and partly of benzoic acid. As a good deal of the balsam adhered to the vessels in which it was imported when these were emptied, he usually made this portion available for the preparation of the acid. The method he adopted was to boil the tins or other packages, to which the balsam adhered, with lime and water, by which means an impure solution of cinnamate of lime was produced, and from this the cinnamic acid was precipitated by the addition of hydrochloric acid.

The following paper was then read:—

ON AN EASY METHOD OF PREPARING ATROPINE.

BY W. T. LUXTON, M.R.C.S., L.A.C.,
Late House-Surgeon to King's College Hospital, London.

This alkaloid, which is of such immense value to the ophthalmic surgeon, and which, I think, will become of almost equal importance to the general physician, is generally, I believe, procured from the *root* of the Atropa Belladonna by digestion in alcohol, so as to form a tincture, to which lime is added to precipitate the atropine, then sulphuric acid is dropped in in slight excess, and the sulphate of lime so formed separated by filtration. A portion of the filtered fluid is then distilled off, water added, and the rest of the spirit driven off by evaporation. Carbonate of potash is now added to precipitate the alkaloid, which is to be collected, dried, and again dissolved in alcohol; water is again added, and it is lastly evaporated and crystallized. 1000 parts of root are stated to yield three of the alkaloid (*vide* Brandes' *Chemistry*).

Now as this is at the best a very tedious process, as well as expensive on account of the time and spirit which are consumed, perhaps I may be pardoned for offering a more simple but equally efficacious one to the notice of this

Society. It nearly resembles the original method of M. Brandes, the discoverer of the substance in question, but differs from it in the circumstance that he precipitated the atropine with liquor potassæ, I with liquor ammoniæ.

A pound of the dry leaves of the belladonna are to be boiled in distilled water sufficient to cover them, for two hours, and the decoction strained off through a coarse cloth into a large precipitating jar. The leaves are again boiled in a second water and the decoctions mixed, to which two drachms of strong sulphuric acid are now added; the vegetable albumen is precipitated, and the clear liquor is drawn off with a syphon to a filter. A clear sherry-coloured solution comes through, which is either decomposed by passing gaseous ammonia through it, or by suspending in it a lump of sesquicarbonate of ammonia. In either case, the colour becomes changed to black, and crystals of atropine are slowly formed. At the expiration of a day or so, the supernatant liquor may be drawn off with a syphon, and the crystals thrown on a filter to dry.

To decolourise them, about an ounce of spirit of ammonia may be poured on the filter, which washes away most of the colouring matter, leaving the crystals *moderately* white.

By this process I have generally obtained about forty grains from a pound (avoirdupois) of leaves, which gives $5\frac{5}{7}$ grs. to 1000 of plant, instead of 3 to 1000.

I have thus endeavoured to describe what seems to me an easy mode of obtaining an agent by which I have been fortunate enough to cure several cases of tic-doloreux (details of which may be forwarded if desired); for which purpose I dissolve an equivalent of atropine in dilute nitric acid, and paint the face at the affected spot with it, until the pain is subdued. This usually occurs in about three to five minutes. The relief experienced is in some cases only temporary, and requires a second and even a third or fourth application, but in many it has proved permanent.

I do not intend for a moment to pretend that it will cure those cases which owe their origin to intra-cranial causes; but in those which are produced by exposure to vicissitudes of temperature and other excentric causes, I have no reason to doubt its superior efficacy over every other known agent. The nitrate of atropine not being crystallizable, the solution may be made of any strength. The following answers very well:—Add two grains of atropine to one minim of strong nitric acid, sp. gr. 1.5, and to this add one drachm of distilled water.

One point which I think deserving of notice in the above process is, that as the caustic alkalies convert atropine into ammonia, the volatile alkali is far preferable as a precipitating agent.

Sutton Benger, Wilts, Nov. 10, 1854.

Mr. R. W. Giles thought the comparison between the process recommended by Mr. Luxton and that of Brandes, to which reference was made, was not conclusive or satisfactory, as the leaves were used in the one case and the root in the other. The same part of the plant should be used in both processes in order to determine which process was the best.

Mr. Bentley said the process described by Mr. Luxton was, as far as he recollected, somewhat similar to that adopted some years ago by Dr. Headland for the preparation of aconitine, and which process had been found to answer exceedingly well.

PURGATIVE FRUIT FROM SOUTH AMERICA.

The Chairman exhibited a specimen of a purgative cucurbitaceous fruit sent him by a gentleman who had received it from South America. He had received no account of the plant from which it was obtained, but the fruit had been called False Colocynth, and its properties were considered to resemble those of the *Momordica Elaterium*, but to be more powerful. It was used in Brazil by beating up the fruit with water, decanting off and rejecting this portion of

liquid as being too powerful for use, then adding more water to the fruit, and using the solution thus obtained.

Mr. Hanbury thought the specimen was similar to, probably identical with, one which had been submitted to a meeting of the Society some years ago by the late Dr. Pereira, and which was considered to be a species of *Luffa*, either *Luffa purgans* or *Luffa drastica*.

Mr. Bentley perfectly agreed with Mr. Hanbury. He thought the moment he saw the specimen that it greatly resembled in its structure a species of Luffa which he had met with some time ago.

THE OXIDES OF ZINC OF COMMERCE.

Mr. Redwood said that some remarks he had made at a former meeting relating to *Oxide of Zinc* prepared by precipitation, had led to a discussion among the dealers in that article, in which he had been accused of having made an erroneous statement. What he said was that the white precipitate obtained from solution of sulphate of zinc by means of ammonia, contained about thirteen per cent. of sulphuric acid, besides a large quantity of water of hydration. This statement had been denied, but he was prepared now to repeat it; and having obtained several samples of the oxides of zinc of commerce since the meeting at which the subject was previously noticed, he found abundant evidence of the truth of what he had then said. It was true that one or two of the samples of oxide of zinc which he had met with, although evidently prepared by precipitation, did not contain any sulphuric acid; but still they were no less impure than the others, as they contained *chlorine* in the place of sulphuric acid, having been prepared by precipitating chloride of zinc with ammonia. Many years ago he had directed the attention of Chemists and Druggists to the fact that what they were using as *oxide of zinc* was not oxide of zinc at all. At that time nearly all the so-called oxide of zinc of commerce was carbonate of zinc; but some few of the samples which he had then met with in commerce consisted of the basic sulphate of zinc to which he had already referred. The carbonate of zinc was easily recognized by its effervescing on the addition of an acid, and Chemists having got into the way of testing it, and of rejecting that which proved to be carbonate, manufacturers appeared to have generally substituted the basic sulphate for the carbonate. This basic sulphate, as already stated, was made by adding caustic ammonia to solution of sulphate of zinc. It contained only about sixty-four per cent. of oxide of zinc, the remaining thirty-six per cent. consisting of sulphuric acid and water. The inquiry which he (Mr. R.) had made within the last few weeks, had convinced him that *true oxide of zinc*, such as the Pharmacopœia ordered, was still rarely kept by Pharmaceutical Chemists. He had hoped that, after the way in which the subject had been noticed on former occasions, Chemists would have been sufficiently prepared to reject the substitution, for oxide of zinc, of substances which have no claim to that name. He thought it a disgrace to the body of Pharmaceutists in this country that, although they had been associated for fourteen years with the view of improving the practice of Pharmacy, they still continued to substitute for a definite chemical compound (oxide of zinc) a substance which had no pretensions to that name. He had brought the subject under the notice of that meeting in the hope that, by reiterating what had previously been said, the Members of the Pharmaceutical Society, at least, may be induced to remove this disgrace from their profession. He believed that the substitution of *carbonate of zinc*, or *basic sulphate of zinc*, or *basic chloride of zinc*, for true oxide of zinc, had originated in a prejudice which existed among Chemists, to the effect, that good and pure oxide of zinc ought to be entirely free from colour. The substances mentioned which had been substituted in commerce for true oxide of zinc, were all perfectly white and smooth powders, and the manufacturers stated that their customers would not receive anything as pure oxide of zinc which did not possess

those characters. This, however, was a mere prejudice, and a great error. So far from pure oxide of zinc being a white powder, it might more correctly be stated, that the fact of any sample of so-called oxide of zinc being in the form of *a perfectly white, smooth, powder*, was presumptive evidence that it was not oxide of zinc at all, but something made to suit an ignorant prejudice in the trade. As regards appearance to the eye, there were two kinds of powder met with in commerce:—

1. *A yellowish-white, smooth, powder*, which is the true oxide of zinc prepared according to the Pharmacopœia.

2. *A perfectly white, smooth, powder*, which consists of one or other of the impure substances which are substituted for the pure oxide of zinc.

The following would comprise the whole of the so-called oxides of zinc now met with in commerce:—

1. *Oxide of Zinc of the Pharmacopœia.*—The process given in the London Pharmacopœia for the preparation of oxide of zinc, is perfectly unexceptionable. The late Mr. Richard Phillips is entitled to the credit of having introduced this process. It consists in first preparing carbonate of zinc by the addition of carbonate of ammonia to sulphate of zinc. By double decomposition, the whole of the sulphuric acid is removed from the oxide of zinc, and the resulting carbonate of zinc, which is precipitated, after being washed and dried, consists of oxide of zinc, carbonic acid, and water. This carbonate is directed to be calcined for two hours in a strong fire, by which means the whole of the carbonic acid and water are driven off, and pure oxide of zinc is left. This, according to the description given in the Pharmacopœia, is *a yellowish-white powder*, which dissolves in ammonia, in potash, and in hydrochloric acid.

The colour of this powder is subject to some variation, being sometimes *nearly*, but never *absolutely*, white. It usually has a very slight buff or straw-colour.

2. *Carbonate of Zinc.*—Some years ago, nearly all the so-called oxide of zinc of commerce was nothing else but carbonate of zinc, being prepared by a process similar to the first part of the process given in the Pharmacopœia for oxide of zinc, but the calcination, which would have converted it into oxide of zinc being omitted. Carbonate of zinc is still sometimes sold for oxide of zinc, but not so frequently as formerly.

3. *Basic Sulphate of Zinc.*—This appears to constitute the greater part of the so-called oxide of zinc of commerce at the present time. It is prepared by adding caustic ammonia to solution of sulphate of zinc, but as oxide of zinc is soluble in free ammonia, it is necessary in this process to avoid adding excess of ammonia, and under these circumstances, the oxide of zinc retains a considerable portion of sulphuric acid besides water of hydration.

4. *Basic Chloride of Zinc.*—This is prepared in the same way as the basic sulphate, excepting that chloride of zinc is used in the process, instead of sulphate. It contains chlorine and water in addition to oxide of zinc.

The three last described varieties are perfectly white, smooth, powders, differing in this respect from the true oxide of zinc of the Pharmacopœia.

One other variety of oxide of zinc may be described, although it does not appear to be a commercial article among Druggists at the present time. It is,—

5. *Oxide of Zinc prepared by combustion.*—The process first introduced into the London Pharmacopœia (in 1788) for the preparation of oxide of zinc (then called *Zincum calcinatum*) directed it to be made by combustion. A similar process was given in the Dublin Pharmacopœia of 1826. The zinc is heated to redness in an open crucible, when it ignites and burns with a blue flame, emitting dense white vapours, which on being collected, constitute the oxide of zinc. The oxide thus produced is white, and when carefully prepared is pure and good, but it is difficult to avoid the loss of a considerable part of the product, which is carried off in the current of hot air in which it has been formed; it is also difficult to avoid the admixture of small particles of metallic zinc, which render it gritty, and are very objectionable when introduced into an ointment. This

variety of oxide of zinc has been made on the large scale as the basis of zinc paint, and thinking it probable that under such circumstances it might be more free from its usual imperfections than that which is made on the small scale, a sample was procured from a large zinc paint warehouse. It was sold as oxide of zinc made for the use of Druggists. On examination, however, it was found not to be *oxide of zinc by combustion*, but *basic sulphate of zinc*, which had evidently been prepared in the usual way by precipitation.

Mr. Redwood wished, in conclusion, to add a brief statement of the mode of testing samples of so-called oxide of zinc, which ought to be adopted by every Pharmaceutical Chemist who desired to use pure drugs.

Method of testing Oxide of Zinc.—Put half an ounce of diluted nitric acid of the Pharmacopœia into a test or measure glass, and add to it twenty grains of the oxide to be tested. The oxide should dissolve in the acid without any effervescence, and should form a clear solution. Divide this solution into two parts, and add to one solution of nitrate of baryta or of chloride of barium, and to the other solution of nitrate of silver. In neither case should any precipitate be formed.

If the sample examined was carbonate of zinc, its solution in the nitric acid would be accompanied by effervescence. If it consisted of basic sulphate of zinc, the solution in nitric acid would, on the addition of the soluble salt of baryta, give a white precipitate of sulphate of baryta, and if it consisted of basic chloride of zinc, the nitric acid solution, on the addition of nitrate of silver, would give a curdy precipitate of chloride of silver.

Mr. R. W. Giles, of Clifton, stated that a circumstance had come under his notice at Bristol which might serve to illustrate the importance of the subject which had just been adverted to. A medical man, who was an amateur artist, had occasion to use a good deal of a certain white pigment, which was sold by the dealers in pigments at a very high price. He therefore submitted some of this pigment to analysis, with the view of preparing it himself, and found that it consisted of oxide of zinc. On procuring some oxide of zinc from a Druggist, however, it failed to produce the required effect, and samples were procured from a great number of similar sources with a like result. Being thus disappointed in his object, he in the next place had the oxides of zinc supplied by the Druggists submitted to analysis, when it was found that they were all largely contaminated with sulphuric acid and water.

Mr. Bastick could corroborate, from his own experience, what had been stated with reference to oxide of zinc. When the *Lancet* was publishing the results of the examination of different drugs and chemicals, he tested a great many samples of commercial oxide of zinc obtained from different sources, and found that they were all impure. He had prepared some himself by submitting carbonate of zinc to calcination, and this he found to be quite pure.

Mr. Whipple thought that manufacturers and wholesale dealers would be put to much inconvenience if their customers became too particular about the absolute purity of the substances supplied to them. He thought it quite sufficient that such a thing as oxide of zinc should stand the tests indicated in the Pharmacopœia.

Dr. Edwards, of Liverpool, said if the manufacturers adhered strictly to the Pharmacopœia, the retail Chemists might confine themselves to the use of the tests described in the Pharmacopœia, but if the wholesale dealers sent out carbonate of zinc for oxide of zinc, and when this was detected, substituted basic sulphate of zinc, and when that was detected, substituted basic chloride, the retail Chemists must use such means of testing as would detect the sophistications adopted.

CONCENTRATED INFUSIONS.

Specimens of *Concentrated Infusions* were placed on the table, which had been presented to the Society by Mr. Frederick Curtis, in anticipation of a discussion on this subject as previously announced.

Mr. Curtis expressed his willingness to answer any questions respecting these preparations. They were, as usual with such preparations, eight times the strength of the infusions of the Pharmacopœia, and when diluted he thought they formed liquor quite equal to, and in some instances better than the ordinary infusions.

The Chairman said he could not agree with Mr. Curtis that concentrated infusions were in any case preferable to those made as directed in the Pharmacopœia. He thought they never completely represented the Pharmacopœia infusions, and that some of them were very different and decidedly inferior in quality. He might instance those of calumba, chamomile, and orange peel, which when prepared as concentrated infusions, possessed properties different from those of the infusions of the Pharmacopœia. He did not wish, however, to discourage attempts at introducing improvements in Pharmaceutical preparations, and thought such an inquiry as the present a sign of a healthy state of the Pharmaceutical body. Concentrated infusions were often used by Apothecaries, and in such cases were found convenient; but when infusions were ordered in prescriptions he thought the Pharmaceutist ought to use those made according to the Pharmacopœia. By adopting the method originally suggested by Mr. Alsop, infusions may be kept for a considerable length of time without resorting to concentration. Mr. Alsop's method consisted in keeping the infusions in bottles perfectly filled and hermetically sealed. The process was described in the *Pharmaceutical Journal*, vol. i., page 57. Mr. Redwood was in the habit of keeping infusions in that way for illustration at his lectures on Pharmacy, and had had some bottles made which rendered the perfect exclusion of the air an easy operation. By such means any infusion made according to the Pharmacopœia, may be kept without injury for twelve months.

Mr. Burden said he had had a good deal of experience in concentrated infusions, but he must say that he had not found any of them to equal the infusions made according to the Pharmacopœia. He thought, perhaps, concentrated infusion of roses was one of the best of them, but he doubted if even this was such as to justify its use in dispensing. Concentrated infusion of senna was certainly much less powerful than an equivalent of the infusion made in the usual way.

Dr. O'Connor agreed with what had been said, especially with reference to concentrated infusion of calumba, which he had found to produce effects quite different from those of the infusion made as directed in the Pharmacopœia. The latter was a much better tonic, especially for children, while the former frequently caused sickness.

Mr. Bastick thought that Mr. Curtis, in bringing these concentrated infusions before the Meeting, ought to have explained the method which he had adopted in preparing them.

Mr. Curtis said there was nothing peculiar in the method which he adopted, and the difference in preparations of this kind depended principally upon the care observed in conducting the process. There was a demand for concentrated infusions, especially among Apothecaries, and if it should be thought desirable to introduce them into the Pharmacopœia, his laboratory book would be at the service of the Pharmacopœia Committee.

The Chairman then adjourned the Meeting, stating that the subject would be again brought forward at a subsequent meeting.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, December 13th*, 1854.

MR. GREENISH IN THE CHAIR.

Several new Members were elected, and a list of Candidates proposed for election was read.

A donation of plants from Mr. Taylor, of Godalming, was laid on the table.

A very interesting account of a botanical excursion in South Devon, in the month of June, was read, from Mr. Gissing, of Worcester, depicting in lively terms the Flora of that beautiful county, and describing the localities of the rarer plants which he had forwarded to the Central Club, for the completion of their herbarium and distribution amongst the Members.

Mr. Reynolds sent for exhibition several specimens of new materials, in a raw state, for the manufacture of paper, as well as samples of the paper which had been made from them.

There were laid on the table some of the stems of the Hop Bine (*Humulus Lupulus*) after the fruit had been matured, and of which there are 10,000 tons available annually for paper; also partly prepared specimens of the rhizomes of the couch grass (*Triticum repens*). The specimens of the manufactured article consisted of brown papers, and a specimen of mill-board from the couch grass gave a very favourable impression of its capabilities. That some considerable attention has been given to find a substitute for linen rags is shown by the numerous articles which have lately been pressed into the service of the paper maker for experimental trials. A specimen sent for exhibition, manufactured at Turin, Sardinia, contained 75 per cent. of peat, with 25 per cent. of linen rags. In addition to these there have been used straw (a common writing paper from which is now regularly sold), sugar-cane refuse, Manilla hemp, Spanish *Espeto*, refuse of cow-houses, &c.

Mr. Reynolds was indebted to the kindness of Mr. Durden for being enabled to lay these specimens before the meeting.

The next meeting, which will be the Annual General Meeting for the election of officers, will be held on Wednesday, January 10th, 1855, at nine o'clock, when the attendance of Members is specially requested.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The usual fortnightly meeting was held on Friday evening, the 24th November, Mr. E. Evans, President, in the chair, when a lecture, of which this is an abstract, was delivered, on

IRON AND ITS SALTS.

BY MR. HAMILTON, F.C.S.

Iron is sometimes, though rarely, found native, so extensive is its range of affinities, that it readily unites with most of the substances with which it comes into contact. There are two distinct species of native iron, meteoric and terrestrial. The different theories accounting for the formation and descent of meteoric stones were noticed, and terrestrial native iron stated to be found in the form of thin plates or scales in gneiss, mica schist, basalt, and lava. The crystalline forms assumed by the sulphides and oxides of iron are chiefly the cube and forms derived from it. Common iron pyrites is a bisulphide, sometimes containing protosulphide, thus forming when exposed to air and moisture, a galvanic circuit, which hastens the oxidation of the constituents, converting the protosulphide into protosulphate, which effloresces out as native green vitriol. Iron pyrites is used in the manufacture of sulphuric acid and green vitriol is obtained from it by roasting and exposure to the air. Arenaceous iron ore and iserine are both magnetic titaniferous compounds of iron derived from the decomposed syenitic boulders of the post-pliocene clays which skirt the banks of the Mersey, Ribble, and Dee. Magnetic iron ore is abundant in Sweden, both massive and crystallized. Specula iron ore and red hœmatite are both

anhydrous peroxides. Clay iron stone, and several other of the ores of iron were referred to, and their composition, &c., explained.

The iron of commerce is obtained chiefly from magnetic iron stone, the hœmatites and clay iron ore; and the various means and operations required to reduce them to the metallic state, were described.

Great economy of fuel has of late years been effected by the introduction of the "hot blast," that is by heating the air with which the fire of the furnace is urged. The following are analyses of iron from the same ore (*a*) reduced from the ore by cold blast (*b*) reduced by the hot blast:—

	(*a*)	(*b*)
Iron	93.29	91.42
Carbon combined	2.78	1.44
Carbon free	1.99	2.71
Phosphorus	1.23	1.22
Sulphur	trace	trace
Calcium	trace	trace
Silicon	0.71	3.21
Manganese	trace	trace
Chromium } Vanadium }	trace	trace
	100.00	100.00

from which it will be seen that the hot blast has the effect of increasing the proportion of silicon. The quantity of silicon is greater the higher the temperature of the blast, and it is still further increased when coke is used instead of coal.

There are three states in which carbon may exist in cast-iron, and it is this which constitutes the varieties of white, grey, and mottled cast-iron; and it is the existence of these varieties of iron in large castings which causes those cauliflower-like excrescences, almost filling up their entire cavity; a galvanic circuit being formed between the grey and the white, of which the grey is the electro positive, and the white the electro negative element, the white oxidizes less readily than it would alone, and the grey more readily, and accordingly a deposit of oxide is formed around the grey as a nucleus. The processes for making malleable iron and steel were then explained, after which the lecturer noticed the changes iron is subject to when exposed to the air, heat, water, or acids.

When iron in fine division, as in the case of the *pulvis ferri*, is exposed to air, it very readily attracts oxygen. When the *pulvis ferri* is prepared from sesquioxide by hydrogen gas at a low temperature, not sufficient to make the iron red-hot, it will afterwards rapidly attract oxygen when exposed to air, and if thrown into oxygen it will take fire. But when a higher temperature is used, sufficient to make the iron red-hot, the particles agglutinate, and form, not pure iron, but black oxide; this will not readily oxidize when exposed to air, nor will it take fire in oxygen gas. Blackness of colour, and the capability of being attracted by the magnet, do not prove that the pulvis ferri has been well prepared. Its retaining its appearance notwithstanding frequent exposure to air affords an argument against its purity, and since the purest preparation is the one which most readily oxidizes, the presence of sesquioxide ought not to be taken as a proof of adulteration or fraudulent dealing. Mr. Walker, who has prepared a good deal of this article, throws down his sesquioxide by means of ammonia, and finds that newly-prepared pulvis ferri takes fire on exposure to air even at a low temperature. Mr. Hamilton concluded a most excellent lecture by referring to all the recognized tests for the per and proto-salts of iron, and will devote a second lecture to its salts.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

A Scientific Meeting of the North British Branch of the Pharmaceutical Society was held in the Rooms, 72, Princes Street, Edinburgh, on the evening of Tuesday, 19th December. H. C. Baildon, Esq., President, in the chair. There was a crowded attendance, including Professor Christison, Dr. Sellar, Dr. Macadam, and Messrs. Mackinlay, Gardner, Bremner, Ainslie, Shaw, Raimes, W. Baildon, Mackay, Tait, &c.

Professor CHRISTISON read the following Address:—

When I repaired to Paris, about thirty-four years ago, to study practically the higher branches of Chemistry, my adviser there, the late eminent physiologist, Dr. Edwards, recommended, to my surprise and curiosity, that I should place myself under the tuition of a Chemist and Druggist. My surprise ceased when I found that I was to have for my teacher, under that designation, the late amiable, inventive, scientific Robiquet. M. Robiquet at that time resided in the Rue de la Monnaie, close to the Pont-Neuf. His dwelling communicated both with his *boutique*, or shop, where he superintended an extensive dispensing establishment, and with his *laboratoire*, or Chemist's laboratory, which consisted of three apartments, one for his junior practical pupils, one for the seniors, and a "sanctum" for the chemical philosopher himself. Here, in immediate contact with the ordinary routine of trade, were carried on with unwearied enthusiasm those scientific researches into the proximate constitution of vegetable and animal substances, and into the nature and properties of their constituent proximate principles, by which the name of Robiquet will be ever distinguished among the earliest and most successful cultivators of this important branch of chemical science.

It required but little acquaintance with French Chemistry to perceive that this distinguished Chemist was the type of a class in France, numerously representing the higher walks of the profession of Pharmacy, men to whom the world has since assigned the most elevated rank as chemical discoverers in a field equally rich in scientific and in practical results.

If you wish to learn who were the men who at that time constituted the leaders of the profession of Pharmacy in Paris, and what has been their influence on practical science, you have only to turn over the leaves of the *Journal de Pharmacie* for the two years 1820 and 1821, a portion of both of which I spent in the French metropolis. In these two volumes you will find detailed the discovery of solania, the active alkaloid of nightshade, by Desfosses; of delphinia, from stavesacre, by Lassaigne and Feneulle; of veratria, in cevadilla and white hellebore, by Pelletier and Caventou; of anemonine, the neutral principle of the garden anemone, by Robert; of gentianine, the medicinal principle of gentian, by Henry and Caventou; of piperine, the neutral crystalline principle of black and white pepper, by Pelletier; and of cinchonia and quina, and cinchonic acid, the peculiar alkaloids and acid of the cinchona barks, described in a paper by Pelletier and Caventou, occupying two entire numbers of the Journal, and usually regarded as the most perfect instance yet produced of an elaborate and successful proximate analysis. Besides the papers announcing these important discoveries, the two volumes present a crowd of valuable investigations by the Pharmaciens of France, among which may be instanced the inquiries of Pelletier on gold and its compounds; of Guibourt on the ammonio-mercurial compounds; of Serullas on the alloys of potassium and sodium with the ordinary metals; of the same author on the presence of arsenic in the medicinal preparations of antimony; of Couverchel on the maturation of fruits; of Braconnot on the conversion of ligneous fibre into gum and sugar by the action of sulphuric acid; of Virey on the formation of galls; of Lassaigne on the colouring-matter of the crustaceous shells; of the same chemist on the composition of the bile; of Pelletier and Caventou on the composition of ambergris and the properties of its constituents; of Robert on certain intestinal and urinary concretions; of Blondeau and Guibourt on the composition of musk; of Chevallier and Lassaigne on pyro-uric acid; of Henry on the constitution of saffron; Chevallier on serpentaria-root; Vauquelin on cubebs; Feneulle and Capron on black hellebore; Petroz and Robinet on carapa bark; Lassaigne and Feneulle on senna; and also a variety of elaborate analyses by Boullay and others of some of the most important mineral waters of France.

Such men could not fail to surround their profession with lustre. The scientific society of Paris was open to them; where, indeed, they moved as in their own proper domain. Some of them even attained to the rank of Member of the French Institute, the rarest and highest of all purely scientific honours in Europe. It could be no wonder then that they also secured for their own branch of the medical art an intimate union with the others, and an elevated position among the constituent professions of medicine. Pharmacy, in truth, was at this time actually represented along with Physic and Surgery, as an essential constituent of the *Académie de Médecine*, by the leading "Pharmaciens," or Pharmaceutical Chemists of Paris. I

have not indeed been able to ascertain the exact constitution of this distinguished body at the period now referred to; but when it was reorganized, a few years afterwards, by an order of the King, and comprised only forty-five "Membres Titulaires," or what we should call Ordinary Fellows, I find that no fewer than nine of these, MM. Fabre, Laugier, Henry, Boullay, Planché, Pelletier, Robiquet, Deyeux, and Vauquelin, owed their appointment to the services rendered by them to science in the department of Pharmacy. At a later period, in 1838, I was introduced, as a corresponding member of the Academy, to one of its meetings, by my old preceptor M. Robiquet; when I had an opportunity of observing how much this "Pharmacien" was respected by all in that assembly of the illustrious in French medicine. Nor have the cultivators of Pharmacy lost any ground in the Academy since that date, for the list of 1853, comprehends the names of Chevallier in the department of Medical Police; Bussy and Caventou in Medical Chemistry; and in Pharmacy proper, MM. Bouchardat, Boullay, Bouriat, Boutron-Charlard, Derosne, all of them, I believe, still practising the profession of Pharmacy in Paris.

But let us now change the scene. In the summer of 1821 I left the Continent, and spent some months in London. Here I could not help falling into some unsatisfactory comparisons and uncomfortable reflections, which have never since entirely left me.

You do not need to be told that at this time no such laboratory as that of Robiquet—ever full of rising Chemists, and ever pregnant with Chemical discovery—was to be met with in the whole profession of metropolitan, or even British, Pharmacy. In the public or private professional or scientific reunions of London, or anywhere else throughout this nation, Pharmacy could scarcely have been recognized for a sister of Physic and Surgery; and I could easily imagine what would have been the consternation of the Council of the Medico-Chirurgical Society of London in 1821, had it been proposed to admit nine London Chemists and Druggists into that learned body upon the strength of their Pharmacy. I have looked carefully through the volumes for 1820 and 1821 of the *Annals of Philosophy*, as containing the most nearly parallel information of English origin, to that supplied for the same years by the *Journal de Pharmacie* in France. But among the authors of papers in the two volumes, I cannot recognize more than a single Pharmaceutic Chemist; and, oddly enough, he was an Edinburgh "Chemist and Druggist," who writes on a rather inconsistent theme, to be sure, for one who practised the healing art, viz., on a detonating compound for firing pieces of ordnance.

But I ought to spare you the recital of facts with which you are probably not unfamiliar. Let me only add, then, as a singularly melancholy episode in the history of British Chemical Pharmacy, that, while France and Germany had been teeming for years with a multitude of imperishable discoveries in vegetable and animal analysis, it was not till 1831 that the detection of an energetic neutral crystalline body in elaterium, at the same period by Mr. Hennell in London, and in Edinburgh by Dr. Morries, now Mr. Morries Stirling, contributed the first active proximate principle of British discovery to the immense pre-existing list of continental origin.

Whence could arise this unpalatable contrast? Plainly, of course, from the grand fact, that Pharmacy was in France and in Germany a scientific profession, but in Britain little or nothing else than a mere trade. But in what sources did that extraordinary difference take its origin? Here was a question which often occupied my thoughts, even from the period of my settling as a Physician in Edinburgh, and of my nomination to the Chair of Medical Jurisprudence and Police in this University, but still more, when my translation to the Chair of Materia Medica, in 1832, brought me into direct and constant contact with the Chemical Pharmacy and Pharmaceutic Chemists of this country.

Probably various causes had conspired thus to prostrate the profession of Pharmacy in Britain. But it is also probable that most, if not all, of them may be traced to one fundamental common cause—the neglect of it, as a profession, by the State. It is, indeed, a dogma with many, that a scientific profession does not need protection or encouragement from the State. To every impartial inquirer, however, it will appear a very startling reply, that, while Physic and Surgery have thriven here, as in every other European country, under the fostering care of Government, Pharmacy alone, which on the Continent has also flourished as a protected scientific profession, had in Britain languished as a trade, disowned by the Legislature until

the most recent times. The fact is, the dogmatists who reprobate State interference in all such State matters have been but blear-eyed observers. Science, as we all too well know, may flourish, notwithstanding indifference and neglect on the part of the Legislature of a country. This is a truth which the British Government has long subjected to severe trial. But it is otherwise with the professions which rest upon science. These professions, unlike the trades, cannot be regulated by what are called the principles of free-trade. And yet nothing is more common than to hear legislators and would-be legislators confounding them all under one category. The principles of free-trade, of non-protection by the State, are applicable only where there is an indefinite, or at least a highly extensible, demand. Now, in what are usually called the professions, in contradistinction to the trades, there cannot exist an indefinite demand, or even any greater extension of demand than in proportion to the increase of the population. Free-trade in the profession of the law is not called for, because it never can be the policy of a nation to increase the demand for law, but quite the reverse. For the same reason the recent notions of some, that the profession of medicine and surgery may be safely reduced to the ranks of free-trade, are crude and dangerous conceptions. If we suppose a country to be supplied, under a careful system of education and licensing, with an adequate number of skilful physicians and surgeons, the great majority of whom are able to gain no more than that competency which is necessary to maintain for them their proper station in society and to provide for those dependent upon them, it would be the height of absurdity for the State to open the door for inundating these professions with ill-educated and unlicensed, or ill-licensed, practitioners, because there is not, and ought not to be, any appreciable extensibility of demand for them. Diseases and injuries do not materially increase; or, if they do, the increase must be occasioned by the ignorance and unskilfulness of the superfluous members of the profession. But, in sober fact, the only result would be the undue subdivision of the necessarily limited gains of the profession and successively, the impoverishment of the pre-existing members, the repulsion of men of education from the practice of the medical art, the gradual degradation of it from a scientific profession to a mere trade.

Now Pharmacy is circumstanced exactly in the same way. The demand for drugs in a country is not illimitable. It is not even extensible. The tendency indeed ought to be, and actually is, diametrically the opposite. Taking the favourite statistical method of inquiry in the present day, if we suppose that every man, woman, and child in this country swallows annually twenty shillings' worth of drugs, the tendency of medical and surgical discovery is clearly to reduce this to eighteen, fifteen, twelve shillings, and so on. Several of you are old enough to tell, and I know it to be a fact, that the amount of drugs prescribed by physicians and surgeons in this city, in any given case of disease, is now greatly below what it was five-and-thirty or forty years ago; and advancing medical science tends constantly to work with fewer and simpler means. Yours is not a profession, therefore, which admits of indefinite extension of its numbers. It is one of those which a wise government would rather restrict, that is, regulate by education and license; so that its members may not only be well qualified, but, being so, may live, and live respectably, elevating their position in society, and drawing closer the ties which manifestly connect their trade with the sciences. If it be left unlicensed, unprotected, uncherished by the state—if every miserable grocer, every contriver of a quack nostrum, or any common artisan who can read and write, and buy a few pots and bottles, and rent a shop, may legally practise Pharmacy—many will follow that art for the barest living; and, thanks to the gullibility of mankind in all things medical, they will succeed. The educated classes of the Pharmaceutic profession are thus grievously injured. Education failing to meet with its just reward, it turns away from the Pharmaceutic profession. And so, with a few bright exceptions, the Chemists and Druggists, as a class, are held down, by the impolitic and unjust neglect of government, below their own proper level, to the retardation of the advance of knowledge and the infinite damage of the community.

You must all see that I am describing the profession of Pharmacy as it existed in this country at no very distant date. You will do me the credit of believing, that as Professor of Materia Medica, and as an eye-witness of a far different state of things in France, I sighed over its condition in Britain, and looked anxiously round for the time and the means of reform. I had not the vanity, however, to imagine, that, even in my position in this University, I could accelerate in any degree its

regeneration. It was always too plain to me that effectual aid could be given only by the powerful hand of government, which I could in no way evoke. It was equally plain, that the first movement towards this consummation must take place within your profession itself. Like other great bodies of men, it was not very likely that you would submit to have reform thrust upon you, even as a boon, from without; I thought it not improbable that you would, least of all, submit to have it pressed upon you by my branch of the medical profession, when I considered how long and how completely mine had severed itself from all community of feeling, interests, and association with yours. But I did hope that a movement would, ere long, originate among yourselves. I could not suppose that Pharmacy would long burn as a shining light upon the Continent, without its rays penetrating among the leaders of your profession and exciting a kindred flame. There was only wanting the soul of every reform and of every great human enterprise—some individual of energy, public spirit, and professional pride, who was both able and willing to devote his life to the hard task;—and there could be no doubt that he would soon succeed in grouping around him the agents and other means of good fortune.

All this has in time come to pass: not indeed as I had looked for, but yet exactly as we might all have wished. By slow degrees the Pharmaceutic profession has of itself organized itself into a compact whole. It has acquired strength enough to extort from the Legislature recognition, and even a measure of state protection. Already the community has begun to reap the infallible fruits in an improved cultivation of your art, and in a growing elevation of your profession. A fair amount of education is now imperatively necessary for all who aspire to a respectable position as Pharmaceutic Chemists. And the monthly Journal of your association already shows that Pharmacy, governed according to its essence, and fostered according to its deserts, will not fail, in Britain as elsewhere, to put on the mantle and extend the domain of science.

These are great strides to have been made in the short space of ten years. But I regard such evidences of improvement merely as a test that your profession is not insensible to the stimulus which has been applied to it, and as an earnest of still greater advancement. Much remains to be done—years indeed will be required to do it—before Pharmacy can reach that eminence in Britain which the example of the Continent must satisfy you all to be attainable.

For such perfection of vitality your Society must be indebted to the infusion of young blood, to the exertions of its younger members. Addressing myself, then, to the rising generation of Pharmaceutic Chemists, let me entreat you, in the first place, to consider how much you owe to your seniors the solid basis already established for your future operations in the same field. They have spent much time, experienced no little anxiety, incurred some obloquy, sacrificed various prejudices, and contributed from their private means, in order to attain an object, the fruits of which they cannot hope themselves to enjoy, and indeed without any hope of reward except the gratifying reflection that they have laboured to promote the general good, and to raise you in public estimation and in self-respect. But above all things, in the second place, show your gratitude by doing diligently the work which they have so well begun.

For this end there seem to be three cardinal means always within reach; which may be comprehended in the brief advice, to extend, educate, and purify your Society.

Strive to extend your Association in every legitimate and desirable quarter. Not that it ought to be the wish and ultimate aim of this Society to multiply indefinitely the number of Chemists and Druggists in the country. Far from it. You will perceive from what has been already said, that the ultimate tendency of your scheme is to extinguish the outlying practitioners in Pharmacy, to lessen the number of practising Chemists, thereby improving the social position of the rest, and, through that event, promoting the good of the community at large. But in the mean time it is important that all reputable practitioners in Pharmacy shall be organized in one solid body, with a common purpose and harmonious principles, in order that you may prevent discontent, lessen opposition, and strengthen power, in preparation for the steps yet to be taken to consolidate your position.

Educate yourselves to the utmost of your means and opportunities. It is not for me, but for the conductors of your Association, to settle what should constitute an imperative education for the future Pharmaceutic Chemists of Britain. But there

are some salient points as to which there can be no mistake, or difference of opinion. Cultivate English literature diligently and classical learning substantially, both for their direct bearings on your profession, and for their humanizing influence over the mind and manners. Add, for the same reasons, Mathematics and Physics, if your means and opportunities permit. Study, above all, Chemistry and Botany, both scientifically and practically; for they are the foundations of Pharmacy as a scientific art. Do not altogether neglect Toxicology and Therapeutics, though more properly branches of physic; for if it be essential that those who prescribe drugs shall know something of their characters, composition, and pharmaceutic forms, it is surely right also, that those who constantly live among them and dispense them, should not be quite ignorant of their active properties and their doses. And lastly, if your resources allow, or your prospects encourage, or your talents impel you, choose one or more of the fundamental sciences of Pharmacy as the subject of special and more elaborate study, in the hope that it may be some day your destiny to enlarge their boundaries, and to win for yourselves a name among their cultivators.

Purify your profession from everything heterogeneous, and everything degrading, by which it has been adventitiously held down, till of late, in this country below that level to which it is justly entitled to rise, and towards which your Association will be a most powerful engine for raising it. Above all, strive to separate Pharmacy from medical practice on the one hand, and from quackery on the other.

It is not a selfish consideration alone which has created among medical practitioners, in England particularly, a great jealousy of the Chemist practising physic. They can also conscientiously insist that the public interest is bound up in their separation. If a Chemist either acquires proficiency, or attains success, in practising medicine, he will infallibly take more interest in that pursuit than in his own proper province. He will therefore often absent himself from an establishment, which, more perhaps than any other in the whole range of trade, requires the constant supervision of the master's eye. What confidence can be placed by the physician or the public in the laboratory of a Chemist who allows himself to be perpetually withdrawn from it by another vocation? It is possible for a medical practitioner to engraft safely the calling of a Chemist on his own more peculiar province, so far as the supply of his own patients is concerned; but the converse, the engrafting of the medical practitioner upon the Chemist, is theoretically impossible, and practically fraught with mischief. You know, however, that medical men are abandoning more and more every day the exercise of Pharmacy as a branch of their profession. How much more, then, ought the Pharmaceutic Chemist to abandon the exercise of medicine!

I can easily see that this object is likely to be attained ere long by a gradual and spontaneous reform from within yourselves. But I confess I do not see the same speedy prospect of correction of another practice, which is undoubtedly alien to a scientific profession, and which, without a doubt, will seriously lower the position of the Pharmaceutic Chemist, so long as he feels compelled to give way to it. This is the dealing in quack medicines.

I am not called on here to show how the abandonment of the present system of patenting medicines is to be reconciled with the encouragement of invention and the reward of discovery in Pharmacy. I must assume—what, with a fitter opportunity, it would be no hard task to demonstrate,—that invention may be duly rewarded on totally different principles; and that the present patent-medicine system, with all its manifest evils, cannot even lay just claim to the merit of rewarding invention. But taking patent medicines as they actually stand, viz., as composed, ninety-nine in a hundred of them, of drugs either dangerous, or inert, or unfit for their alleged purpose, or at best not more fit than common things which anybody may purchase for at most a tenth of their patent value, I say it is a great drawback on a scientific profession, that its members should be obliged, or should be taught to feel themselves obliged, to act directly or indirectly as agents in the disposal of such wares. I know what many of you have felt in acting in that capacity; I am aware it is difficult for you to avoid doing so; but I hope the time is not far distant when the medical profession and your Society will unite their strength to compel the Government of this country to cease from the baseness of levying a tax for the encouragement of imposture; and then there will be no difficulty in the case.

At the conclusion the Chairman proposed a vote of thanks to Professor Christison

for the very able and interesting communication he had read before the meeting, which was seconded by Mr. Raimes, and carried unanimously, with acclamation.

Mr. Mackinlay then proceeded to deliver a lecture upon Photography, but as the subject is to be completed upon some future occasion, an abstract of the two papers containing the most approved modes of preparing the materials at present employed in this art, will then be given. Mr. M. illustrated the first part of his subject by some very beautiful photographic drawings, the exhibition of which afforded much satisfaction.

Mr. Mackay brought before the meeting the subject of mechanical leeches, and exhibited two which he had some time ago procured from Paris. One was intended for hospital use, and the other for the convenience of medical practitioners in the country. Considerable discussion ensued, both as to the capability of this ingenious instrument, and also as to the best mode of keeping the natural leech in a healthy state. Professor Christison thought that something might be done to improve the leech, as usually retailed, and gave the result of an inquiry made into this subject in Paris by direction of the French authorities.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE AMOMA OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.R.G.S.
Honorary Member of the Pharmaceutical Society.

The equinoctial regions of Western Africa, furnish perhaps no genus of plants whose species are more difficult of distinction, or require such a practical amount of knowledge for their pharmaceutical or botanical classification, as the Mallaguetta peppers. The near similitude which the leaves, flowers, and fruit bear to each other, with their minute and almost imperceptible deviations in development and structure, render their diagnoses a task of no easy accomplishment. The erroneous statements and obvious discrepancies, hitherto published concerning them, may, in the majority of instances, be traced to the several botanists, who have attempted to define their specific characters from imperfect specimens, and the want of precise information, and it will require no little exercise of judgment, to analyse those fragmentary descriptions, by which the subject has become not only more complicated, but involved in deeper confusion and obscurity.

The Mallaguetta pepper was a spice evidently known in England for many years prior to the death of Edward VI., yet its general use could not have been firmly established until the reigns of Mary, and her two successors, and then only in consequence of the large quantities directly imported from the African coast. From this date, its value as an article of commerce began to decline, in proportion as other aromatic products were poured more freely into the markets, and attracted a greater share of public favor. Their ordinary dietetic employment rapidly conduced to the depreciation of the former as a condiment, and though occasionally resorted to as such, in subsequent years, it nevertheless gradually fell into disuse, and was only eulogised as a remedial agent, possessing some medicinal virtues.

With the exception of a few papers, briefly delineating some particular species, occurring at intervals within the present century, the Amoma to a certain extent remained unnoticed, and it was only in later days they were brought more prominently into notice, by the unwearied zeal and research of the late Dr. Pereira. This able pharmacologist devoted considerable time and trouble, in sifting from the scattered publications, such data as he conceived worthy of record, and selected with sound discrimination, the most interesting facts in illustration of their history, which, after an enunciation in various preliminary dissertations, were partly embodied in his elaborate work on Materia Medica. The merit of succinctly pointing out the characteristic differences between the numerous species of this important class of plants, especially with reference to

the "grains of Paradise" and cardamoms (so incorrectly classed together by many authors) and condensing into a more systematic form all that had been written about them, must undoubtedly be ascribed to his assiduous labors. Ever desirous of collecting information that might advance the progress of pharmaceutical science, or throw fresh light on the medicinal substances employed in the civilized world, he omitted no opportunity of impressing upon travellers the necessity of obtaining more authentic accounts of the vegetable productions indigenous to the countries they visited, and of which little was known. During my tours of service along the coast of Africa, his solicitude for the discovery of any new species of Amomum was ever predominant, and whenever rare and unknown specimens fell under his hands, no one could evince a greater degree of pleasure and satisfaction by their acquisition. Constantly expressing a wish that the aboriginal history of all the species that had been previously mentioned, should be more fully investigated, I have, in fulfilment of a promise made a few months before his death, now drawn out the results of a few inquiries, and incorporated them with other observations in the present monograph.

The term Amomum, adapted from the Greek *ἄμωμον*, is of very ancient origin. Allusion has been made to it in the writings of Persius, Pliny, and Juvenal, and also in Dioscorides and other Greek authors.* Some authorities claim the derivation from the Arabic حَمَامَا *hámámá*, and Golius in his Dictionary has so expressed the signification. This source, however, must be considered rather doubtful. The designation, though formerly embracing a wider range of objects, is now chiefly restricted to the zingiberaceous and other plants, producing aromatic pepper or spice. These commercial importations have at various times been brought under the cognizance of several distinguished men, who, so far as their limited sources would permit, furnished such descriptive details of the fruit, flowers, or portions of each plant, as by chance fell into their hands. Among the most familiar names may be mentioned Valerius Cordus, Mathiolus, Bauhin, Clusius, Burman, Gærtner, Dale, Bontius, Trew, Geoffroy, Alston, Geiger, Pereira, T. Martius, and Guibourt; while those of Linnæus, Willdenow, Afzelius, Smith, Roscoe, Roxburgh, Nees ab Esenbeck, Moon, Royle, Loureiro, and Hooker fil, may be adduced as pertaining more appropriately to the botanical history.

The seeds of certain species of Amoma, found exclusively prevalent in the African tropics, have been recognized by a variety of denominations. On the fruit of one of the most important of these species, and on *this alone*, partly understood by some as the *Amomum Grana Paradisi*, were the appellations of *Grains of Paradise*, *Guinea grains*, *Guinea pepper*, and *Mallaguetta pepper*, originally conferred. This limitation cannot be too strictly enforced, otherwise unavoidable confusion must ensue, since later botanists not thoroughly conversant with the subject, have perpetuated errors by their indiscriminate appliance of the same titles to other kinds of Amoma.

It would be a difficult matter to ascertain at what period the Mallaguetta was first introduced into England, though proofs, doubtless, remain to attest that

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* "Dicitur *ἄμωμον*, ab odore bono, qui reprehendi minime queat. Hunc videntur Græci omne aroma, quod sincerum et inculpatum esset *ἄμωμον* vocasse, sic *ἄμωμον λιβανιον*, thus sincerum: Arabes Hamama, Turcæ, Amama vocant." Pretiosissimis unguentis addebatur, ut Plinius, l. 13, c. 1 et 2, et Dioscorides, l. 1, c. 14. Poetæ pro quolibet unguento ponebant Amomum. Sic:—

'Et matutino sudans Crispinus Amomo
Quantum vix redolent duo funera.'—*Juvenal, sat.* 4, *v.* 108-9.

'Crassoque lutatus Amomo.'—*Persius, sat.* iii., *v.* 104.

Inde Amomiam (momiam et mumiam vulgo) recentiores vocaverunt omne illud quo corpora mortuorum ungebantur et condiebantur."—*Vide Bod. in Theoph.*, 1014. *Alston's Lectures on Materia Medica*, 1770, *vol.* ii., *p.* 337.

it was long in use antecedent to the sixteenth century. The inhabitants of Southern Europe appear, however, to have been aware of its existence at a much earlier period; and there is equal reason to believe that even before their knowledge of its value, the older Greek and Arabian physicians were tolerably acquainted with the same, or a product closely allied to it. The place of its growth for centuries was unknown. The price consequently became high, owing to its rarity and difficult attainment. An aromatic and grateful pungency stamped its endowment with mysterious powers, then deemed capable not only of relieving sickness, but from the diversity of its properties, of prolonging life. The seeds prized as a rare spice, were esteemed wholesome adjuncts, in the culinary art, and their reputed utility obtained for them in Italy, the name of Grains of Paradise.*

These grains of paradise had gained sufficient celebrity in Europe, long prior to its exportation by the earlier Portuguese traders, from the coasts of Western Africa. The source of the supply before that event could never be clearly traced. The mode and route of intromission into Italy, were ultimately discovered to be the same by which inconsiderable quantities are conveyed to the shores of the Mediterranean, at the present time. Marmol, a Spanish writer of note (who, after a detention of several years in captivity among the Moors, compiled a work on African geography, chiefly taken, as report avers, from that of Leo Africanus) gave the first definite account of the regions producing this spice, and the route by which it was transmitted from them. He observed that the merchants of Barbary traversed the entire kingdoms of Mandingha in Nigritia (Soudan), and the country commonly called Guinea, to procure these grains, and that from Barbary a part were "transported into Italy, where it was called *Grains of Paradise*, because its origin was unknown there."† The accuracy of this statement regarding the system of conveyance may be verified by a reference to the itineraries of recent travellers, or the ordinary Soudan kafilas.

Of this product no illustration has been noticed among the articles of tribute depicted on the temples and tombs of the ancient Egyptians, as belonging to the negro kingdoms of inland Africa. They may, notwithstanding, have acquired some knowledge of it, from a report of its aromatic qualities, obtained by means of a constant communication held with these countries, where it was abundantly used. If so procured they would probably have rendered the seeds subservient for dietetic uses, or in the embalment of their mummies. From Egypt it might have eventually been carried to Greece, and various parts of Europe.

Delile, in the *Flore d'Egypt*, mentions under the Arabic name of تين للفيل (*Tyn-el-fyl*) a fruit, which he refers to the *Maniguetta Officinarum* of Geoffroy, and which, if not the true *Amomum Grana Paradisi*, would possibly be the *A. Korarima* of Pereira, and the خيل (*Kheil*) of the Arabs in Abyssinia.‡ The *Cardamomum Magus* (قاقلي جنشي) of Forskal may probably belong to one of these species.§ Now the Cardamom (*Elateria Cardamomum*, Mat.) is distinguished either by those of حَب هال (*hab.-hal*) or حَب هان (*hab-han*) while the Mallaguetta pods are generally recognized by the respective designations of تين و تمر

* In the *Remedia Guineensia* of Afzelius, are the following remarks :—"In usum medicum ad curandas Febres intermittentes, Paralysin, et morbos alios atque in genere pro *Pipere* et *Capsico* quamquam olim in multis Europæ regnis, frequenter adhibita fuere semina hujus *Amomi* vehementer stimulantia et calefacientia, easque ob virtutes tam magni habita, ut *Grana Paradisi* vocarentur, nostris tamen temporibus ut remedium, apud gentis Europæas fere ubique reviluerunt."—*No.* x., *p.* 73.

† *Barbot, Description of the Coasts of North and South Guinea, b.* ii. *c.* vii., *p.* 135.

‡ *Description d'Egypt, vol.* ii., *p.* 81, *&c. of Nat. Hist.*

§ *Flora Ægyptiaco-Arabica, p.* 149, *m.* 5.

للفلفل *Teen* and *Tamar-el-felfel;* that is, the fig or date pepper, these terms being deduced from the capsule resembling somewhat in shape these fruits, and their seeds partaking of a pungency similar to that of pepper. The word *Tamar* may also be translated into "*fruit*," and this signification might perhaps in other places be substituted for the previous one. Lyons, in his travels from Tripoli to Murzuk, in detailing the mercantile products brought from Soudan, alludes to the *Tammerat-el-felfel*, "a large pod, in shape resembling a walnut, and containing many small seeds of a very pungent taste, equal to the Cayenne pepper."* There can be no doubt that this is the capsule of the Mallaguetta or grains of Paradise. It is a singular circumstance that in Bambarra and the circumjacent Mandingo countries, the vernacular title of the date should be "*Tammerat*," one evidently derived from, or synonymous with the Arab, "*Tamar*," and also employed to designate the same pods, which, when obtained from the mountain districts, are of such reduced dimensions, as to constitute a similarity of form, sufficient to merit the appropriation of the term. These remarks will, to a certain extent, support the statements of Marmol, and likewise tend to prove, that by the caravan routes through the Sahara of modern times, and probably from the ages of a remote antiquity, there could be no great difficulties to impede the introduction of the Mallaguetta or any other vegetable production from Central Africa, by the usual Darfour road, into Egypt, and by that of Fezzan into Tripoli, and so from thence, to be distributed throughout Southern Europe.

An erroneous impression prevails, that all the species of Amoma originally exported from the African coast, possessing pungent properties, came under the denomination of grains of Paradise, and that it was only of recent date the special distinction, and recognition of the fruit producing it had been properly educed. These reports, based on very vague and unsatisfactory grounds, are not of easy refutation, and as a considerable amount of research is requisite, to impugn their authenticity, it will be necessary to briefly advert to the commercial history of these imports.

During the first expeditions of the English to Western Africa a particular portion of the coast attracted their attention, principally from the fact of the natives bringing on shipboard an abundance of aromatic and peppery seeds, of a pleasant flavor, which they invariably vended by an aboriginal appellation. This maritime tract of land, extending from the river Sestros to a few leagues eastward of Cape Palmas, in lat. 4° 24′ 0″ N., and long. 7° 46′ 10″ W., embraced a distance of 140 miles, and was known to the European merchants by a nomenclature peculiar to each nation, the Dutch calling it Greynkust, the French Mallaguetta, and the English the Grain or Pepper Coast. Its characteristic product was in England consecutively termed *Grains*, *Guinea grains* or *pepper*, *Manigete*, *Meligete* and *Melligetta* pepper. In the course of time the traffic in this article became so remunerative as to induce the shipping to enter into a zealous competition. The inhabitants consequently being unable to meet the increased demand, soon resorted to the expediency of adulterating the original with other spurious kinds. By the native and European factors these frauds could be at once detected, for the former were in the habit of perforating the pods of the true pepper, and suspending large quantities within their huts, by means of withes passed through these apertures, in order to dry and preserve them from the depredations of insects, to which they are apparently liable. This is, at the present day, a common practice in most of the negro countries, in which they abound, and is exclusively reserved for the Mallaguetta vera, and not for any other species, as such were deemed valueless. This peculiarity will afford an explanation of the cause of the holes being found in the capsules alluded to by some of the earlier authors in their descriptions of the

* *Vide* p. 156.

fruit. The latter, taught by experience that the value of a cargo would be materially diminished if inferior products were forwarded to the home markets, exercised, therefore, a vigilant supervision in the selection of those qualities, as would ensure a profitable sale, the form of pod, taste, and colour of the grains, with other concomitant details, yielding a criterion by which their purchases could be regulated.

A concise account of the plant and seeds are frequently given in the voyages published in Hakluyt's "Collection," and in the works of the older herbalists and Guinea traders. Although it was noticed that various species of Amoma were indigenous to the coast, yet most of the writers, more or less, conclusively agree in delineating *the one*, then, but only recently again determined to be the true grains of Paradise. Wyndham, in his voyage to Benin, so far back as 1553, briefly mentions this pepper as "the graines of the country of Sestros," "a very hote fruit, and much like unto a fig, as it groweth on the tree;"* and John Lock, who visited the Gold coast in 1554, carried home with him as part of his cargo no less than *thirty-six butts* of these "graines." In his journal he thus naïvely observes, when "speaking of the fruit of graines, I described the same to have holes by the side (as indeed it hath as it is brought hither), yet I was afterwards informed, that those holes were made to put strings or twigs through the fruit, thereby to hang them up to dry at the sun. They grow not past a foot and a-half or two foot from the ground, and are red as blood when they are gathered. The graines themselves are called by the Physicians Grana Paradisi."† In the voyage of Towrson to Guinea, made in 1555, the term *Manegeta* first occurs, and being the one by which this pepper was sold by the natives to the Europeans, was sometimes adopted by them, and also on this account bestowed on the maritime belt of coast above defined. Gerard, Parkinson, and other authorities who flourished about the commencement of the seventeenth century, concur in correctly describing the same pods, illustrated by tolerable figures, in their medico-botanical treatises, under the head of Graines, or Graines of Paradise, stating that they were occasionally called *Mileguetta* and *Milegetta*, and grew in "*Ginny*." The former remarks, that "the fruit is like a great cod or huske, in shape like a fig, when it groweth upon the tree, but of colour russet, thrust full of small seeds or graines of a darke reddish colour, of an exceeding hot taste."‡

Barbot, who enjoyed a comprehensive knowledge of the vegetable exports of African commerce, and was well versed in the geography of the coast, has entered somewhat minutely into the history of this production, in his interesting work on Guinea. He remarks that the "Blacks of Sestro call it *Waizanzag*, and those about Cape das Palmas, *Emaneguette*. That which grows in the River Sestro is the largest of all this part of the pepper coast. It is a sort of shrub, the leaves broad, thick, and pretty long, and much like those of the nutmeg-tree. The bushes grow so close together, that in some places at Sestro, they look at a distance like thickets, or small coppices. The fruit is almost oval, but pointed at the end, being a thin husk, at first green, and when dry of a fine scarlet, about the size of a fig, and soft, is not filled with any pulp, but within it is the *Maniguette* growing in four or five rows, and covered with a white film, which also separates each grain or seed, and these are white, very sharp, biting beyond the hottest pepper. These grains before they ripen are red, and of a grateful taste. The best are of a chestnut colour, large, ponderous, and very smooth, the black are the smallest. They take their colour as they lie aboard the ship, being put up green. The seed is neither so large or round as the *Indian* pepper, but has several angles. The stalks of it taste somewhat like cloves. There is another sort of *Maniguette*, growing like large-leaved

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* *Hakluyt, vol.* ii., p. 12. † *Id. op.* p. 22.
‡ *Herball, lib.* iii., ch. 154, *p.* 1541.

grass. That which is bought from the middle of November till March is certainly a year old, for the new begins to bud in January."*

A diversity of opinion exists relative to the etymology of the word *Mallaguetta*. Some have ingeniously traced it to an Italian and Portuguese source; but Barbot asserts that the name of this pepper, in the Portuguese language, was *Cestos*, and the river from whence the largest amount was procured, became thus entitled *Rio dos Cestos*, since corrupted by modern Europeans into Sestros. It is a matter of surprise why the derivation of this term should have been mooted, when so many authorities have explicitly declared it to be a native designation, and in this respect there can be no question as regards their veracity, since its ordinary title now on the Kroo-coast is *Guetta*, to which the distinctive prefix of *Male* or *Mane* is sometimes joined, the liquids l, m, n, being usually substituted one for the other by the Kroo-races, in accordance with the rules of African orthography.†

The geographical distribution of the Amoma in tropical Africa embraces a vast extent of country. Numerous species are scattered throughout the coastal regions, and from the banks of the Senegal to so far south of the equator as Benguela, and probably the confines of the Damara territory, they flourish in a greater or less degree of luxuriance. Equally well known and as widely extended in Soudan and other parts of interior Africa, their diffusion has penetrated within parallel degrees of latitude more remotely eastward, and the fruit has been even met with in Abyssinia and the Galla kingdoms. In some districts the plants occur in solitary patches, are of a dwarfish aspect, and scantily produced; in others, on the contrary, they teem in wanton profusion, and by the rapid propagation of their roots, so gradually overspread the cultivated lands, as to assume the character of a weed, difficult of eradication. In elevated localities, or where the soil is poor and sandy, their growth is materially restricted, while in the rich and loamy soils of the lowlands, and in other favorable situations they are more exuberantly developed. Position, nature of soil, and other attendant circumstances essentially modify their botanical characteristics. They chiefly delight in humid and shady places, sheltered from the sun, and shoot up either among the brushwood on the verge of forests, or within the coverts of denser thickets. The species are rather difficult of distinction, for the majority are so nearly allied, both in configuration and habit, that to identify them on certain occasions, would be a most perplexing, if not useless labor. Although living for months with several kinds growing under my immediate notice, I have nevertheless failed to discern their differences when the plants were in leaf solely, and in none, perhaps, with the exception of the *A. Longiscapum*, Hooker fil, or the narrow lance-shaped leaves of the lesser variety of the *Mallaguetta vera*, could they, when in this state, be detected one from the other. The flowers and fruit, however, afford better means for their identification, and offer variations tolerably conspicuous to effect their recognition.

Among the four kinds of cardamoms enumerated by Pliny, it is not improbable that one of the African Amoma might have been included. We, however, possess no clue to solve this mystery, and know not under what class the products he mentions could be precisely referred, for the confusion and uncertainty that has since reigned, from the indiscriminate blending of various scitamineous fruits under one specific term, has considerably added to the complexity of the subject. Not a few of the African Amoma, have been confounded with others obtained from the East Indies, and the names belonging to one species of plants, have been frequently bestowed on others widely at variance. Much of the doubtful nomenclature has been dissipated by the judicious arrangement of the

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* *Churchill's Collection of Voyages, vol.* v., *ed.* 3. *Vide Barbot. Descrip., Book* ii., *ch.* vi., *p.* 132.

† Grain coast is named "Melliguette or Melli, from the abundance of *grain* of *Paradise* there growing, which the natives call Mellegette."—*Ogilby's Africa, p.* 413.

genus, by the late Dr. Pereira, who educed the peculiar features of each class, and by his lucid researches, discovered that on the produce of no less than six or seven scitamineous plants, had the designation of grains of Paradise been applied.

The Mallaguetta pepper was formerly distinguished by the names of *Cardamomum piperatum*, *Cardamomum Majus*, *Maniguetta officinarum*, and also independently of others of vernacular origin, as the larger *Cardamom.* By some it was identified with the *Chachula keebir* of Avicenna, in contradistinction to *Chachula sagheer*, supposed to be the lesser or true Cardamom. It was officinal prior to 1722, and in the Edinburgh and Paris Pharmacopœias of that date was stated to be the "*Fructus Grana Paradisi*" and "*Cardamomum Majus*," but was expunged from their pages in a subsequent revisal. The seeds were administered as a stimulant, carminative, and stomachic, in doses from ten grains, to one scruple or more.

Linnæus was considered to be the botanist who first described the Mallaguetta pepper, until Pereira demonstrated that it was very doubtful to what production he had applied the term of *Amomum Grana Paradisi*, as he referred to the East Indies, with that of Guinea as its native locale, since ascertained not to be correct. Dr. Afzelius, who visited Sierra Leone about the end of the last century, appears to have been fully acquainted with the true pepper and other Amoma indigenous to the colony, from personal experience in their collection.

(*To be continued.*)

ON THE BARK OF *GOMPHOSIA CHLORANTHA*, WEDD., OCCURRING MIXED WITH QUILLED CALISAYA BARK.

BY JOHN ELIOT HOWARD, ESQ.

In continuation of the series of barks which I have deposited in the Museum of the Pharmaceutical Society, I now send a specimen recently obtained in commerce of the bark of *Gomphosia chlorantha* of Weddell.

This tree, according to Weddell,* "characterizes, up to a certain point, the vegetation of the localities which it inhabits. Its bare and silvery trunk, which in general surpasses in height (without ramifications) all the rest of the forest, and its top, in the form of a chandelier, attract the attention of the traveller at a distance." "It grows abundantly in Carabaya, at the same height as *Cinchona Calisaya*," and presents so deceptive a similarity to that valuable tree in the general appearance of its bark, that a considerable quantity mixed with Calisaya, recently passed in the London market as *Calisaya Quill of a superior quality*, and obtained a corresponding price.

The bark of *Gomphosia chlorantha* does not contain a particle of any alkaloid, but yields a notable quantity of essential oil possessing the peculiar fragrance of the bark in a concentrated form.

I first identified this bark with a specimen which I had received from Dr. Weddell, and which he had collected himself. I also transmitted to this distinguished naturalist a portion of the bark recently imported, which he recognized as corresponding with his own specimens. Its most distinctive peculiarity is shown by the microscope, a transverse section disclosing a peculiar fasciculate disposition of the cortical fibres, and some vessels gorged with a ruby-coloured juice. The tree, though botanically very nearly allied to the *Cinchonæ*, thus differs wholly in its properties from that genus, and is calculated to deceive by its resemblance to a more valuable product of the forests of New Granada and of Peru.

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* *Histoire Naturelle des Quinquinas*, p. 97.

ON COPALCHE BARK.

BY JOHN ELIOT HOWARD, ESQ.

I BEG to present to the Pharmaceutical Society a specimen of Copalche Bark, the produce, according to Pereira, of *Croton Pseudo-China*, and described by him in his *Elements of Materia Medica*, vol. ii., pt. 1, p. 1283. It is part of a recent importation of about sixty bales, brought from Puntas Arenas, in the gulf of Nicoya. From the situation of this port, it is probable that the bark is the produce of some part of Costa Rica. The specimen is evidently identical with Pereira's specimen of *Quilled Copalche*, which is deposited in the Museum of the Society. The odour in burning is that of Cascarilla, and in both these specimens the appearance of the singularly indented, resinous-looking derm where denuded (especially when observed with a magnifying glass), is a highly characteristic feature of the species. It appears, as Pereira indicates, to be the sort figured by Goebel and Kunze* and ascribed (owing to a suggestion of Humboldt) to the *Croton suberosum*. This is more probably the origin of Pereira's *Corky Copalche bark*, which was described by my friend Dr. Stark, in 1849, from specimens which I had the pleasure of forwarding to him. This latter kind is corky in the extreme, which is not the case with the *Quilled Copalche* now before us.

The feature which is most interesting in the chemical examination of the bark, is the presence of a bitter alkaloid, soluble in ether, and precipitable as a white hydrate, from its solution in acid; of this I have assured myself by two experiments, guarding very especially against the possibility of mistake from any source. The bark contains, in addition, a large percentage (6 per cent.) of fragrant wax, as well as some fatty matter. Brandes obtained from the *Croton Tiglium* a crystallizable substance which he called *Crotonin*, and thought to be a peculiar alkaloid, but this was brought into question by Weppen, who found only a magnesian soap with an alkaline reaction †. The alkaloid which I have obtained, *yields a deep green colour with chlorine and ammonia.* The proportion in the bark is about 0.05 per 100 parts. The taste is not unlike that of quinine; but it appears to differ from this alkaloid in being (apparently) crystalline, and in not affording under the microscope the appearance which Herapath has so well indicated as *the test* for quinine,—neither does it answer to quinidine. It deserves further examination.

ON THE SO-CALLED OIL OF CINNAMON LEAF FROM CEYLON.

BY JOHN STENHOUSE, LL.D., F.R.S.

FOR the last ten or twelve years, considerable quantities of cinnamon leaf oil have been imported from Ceylon into Great Britain. The cinnamon leaf oil of commerce is of two qualities, one of which is adulterated with a considerable quantity of a fixed fatty oil, but the other, which sells at a much higher price, consists wholly of essential oil.

Little is known with certainty of the origin of this oil. Dr. Pereira, in the last edition of his *Materia Medica*, page 1308, states: "That he was informed by a gentleman on whose estate in Ceylon this oil is obtained, that it is procured by macerating the leaves of the cinnamon-tree in sea-water, and afterwards submitting them to distillation."

The quantity of cinnamon leaf oil on which I operated, was kindly given me by Messrs. Quincey and Son, Billiter Street, City. It had been in their possession from two to three years.

Oil of cinnamon leaf, both in its appearance and properties, very closely resembles the oils of cloves and pimento. It has a brownish colour, and a specific

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* Goebel and Kunze: *Pharmaceut. Waarenk.*

† Pereira, *Elem. of Mat. Med.*, ed. 3., vol. ii., part 1, p. 1274.

gravity of 1.053. Its smell is aromatic and penetrating. Its taste is exceedingly pungent. It has an acid reaction, and when treated with solutions of potash or ammonia, it solidifies, forming a butyraceous crystalline magma. Like clove and pimento oil, it is essentially a mixture of eugenic acid and a neutral hydrocarbon, having the formula C_{20} H_{16}. Cinnamon leaf oil is remarkable, however, for containing a small quantity of benzoic acid.

When the crude oil was distilled, a colourless oil came over, while the residue in the retort became gradually darker. The last portions of the oil which passed over, on being set aside for some time, deposited crystals which had all the appearance and properties of benzoic acid. Their quantity was, however, so very small, that they could not be subjected to analysis. I at first suspected these crystals to be cinnamic acid, but I soon found this was not the case, for on treating them with a hot solution of hypochlorite of lime, they did not give the very characteristic reaction of cinnamic acid, namely, the production of that singular chlorinated oil which is always produced when cinnamic acid is treated in this way. That these crystals were really benzoic acid, was ascertained as follows:—When the last portions of the oil which had come over, together with the residue remaining in the retort were digested with strong nitric acid, along with much oxalic acid, a small quantity of another kind of crystals were obtained, which in appearance and properties agreed perfectly with nitro-benzoic acid. They were carefully purified and subjected to analysis.

0.1125 grammes gave 0.2095 grammes of carbonic acid, and 0.0305 grammes of water.

The calculation for nitro-benzoic acid (C_{14} H_5 (NO_4) O_4) requires—

	Theory.		Found.
C_{14}=84	..... 50.29	.....	50.79
H_5 = 5	..... 3.00	.....	3.01
N =14	..... 8.38	.....	—
O_8 =64	..... 38.33	.....	—
167	100.00		

Of the silver salt of this acid, 0.12 grammes gave 0.046 grammes of silver, corresponding to 38.33 per cent.; theory requires 38.32.

The first portions of the colourless oil which distilled over were again rectified, when the boiling point was by no means constant, though the greater portion of the oil came over at a temperature approaching the boiling point of eugenic acid.

The oil was treated with an excess of potash, and the hydrocarbon which did not combine with the alkali, was drawn off by a pippette. It was next treated with fused potash, then with chloride of calcium, and lastly rectified over potassium. In this way a colourless, highly refractive liquid was obtained, the greater portion of which distilled over between 160° and 165° C. Its specific gravity was 0.862, and its smell closely resembled that of cymene. The results of its analysis agree exactly with the formula C_{20} H_{16}.

0.1165 grms. gave 0.3765 grms. of carbonic acid, and 0.1225 grms. of water.

	Theory.		Found.
C_{20}=120	..... 88.24	.....	88.14
H_{16}= 16	..... 11.76	.....	11.68
136	100.00		99.82

The portion of the oil which dissolved in potash lye (the eugenate of potash) was heated for a considerable time with agitation, in order to drive off the last portions of the hydrocarbon which might be adhering to it.

It was next saturated with sulphuric acid and the liberated eugenic acid still further purified. It agreed perfectly in its characters with those ascribed to

eugenic acid by the Chemists, Bonastre,* Ettling,† and Boeckmann,‡ who have examined eugenic acid. Its boiling point was found to be 242° C., and its specific gravity 1.076.

The results of its analysis agreed very closely with those of former experimenters.

I. 0.3290 grms. gave 0.8715 grms. of carbonic acid, and 0.2135 grms. of water.

II. 0.2645 grms. gave 0.6985 grms. of carbonic acid, and 0.1765 grms. of water.

	Theory.		Found.	
C_{24}=144	..... 72.36	.....	72.24	..... 72.02
H_{15}= 15	..... 7.54	.....	7.21	..... 7.41
O_5= 40	..... 20.10	.....	20.55	..... 20.57
199	100.00		100.00	100.00

A FEW PRACTICAL OBSERVATIONS ON THE COMPOUND COLOCYNTH PILL OF THE LONDON PHARMACOPŒIA OF 1851,

WITH SUGGESTIONS FOR AN ALTERATION IN THE FORMULA.

BY MR. T. SOUTHALL.

The College of Physicians having invited the aid of Pharmaceutical Chemists in order to determine the best formula for a future Pharmacopœia, it becomes their duty to consider how they can promote the object in view.

This consideration induces me to bring before the notice of the readers of the *Pharmaceutical Journal* a few observations on the Compound Colocynth Pill.

The plan adopted in the Pharmacopœia of 1851, of using a certain quantity of simple extract instead of the whole of the extract produced from three times the weight of colocynth pith, may, I think, give rise to considerable discrepancy in the strength of the compound, for, besides the difference in the amount of water which extracts are liable to contain, the proportion of active principle and inert extractive matter in different specimens of colocynth is liable to vary.

For instance, an extract prepared from fine white colocynth pulp would probably contain above seventy per cent.§ of colocynth resin, while an extract made from brown colocynth might not have more than forty per cent.

The brown colocynth contains, as far as I have ascertained, as great a percentage of resin as the white, only it also contains, owing probably to the destruction of a portion of its ligneous fibre by decay, a greater amount of extractive matter; and while this would weaken the pill mass in which a prescribed quantity of extract is used, it would not affect its strength in any material degree if the extract from a certain amount of pith were employed.

I would therefore suggest that, in order so far as this ingredient is concerned to ensure uniformity of strength, the colocynth resin itself should be used in making the compound colocynth pill.

Colocynth resin is readily prepared by the following process :—

An extract made by exhausting the pulp either with cold water or diluted spirit should be dried by gentle heat and powdered, the powder digested in two or three times its weight of rectified spirit, and the clear tincture, after having been filtered off, evaporated till the residual extract, when cold, will reduce to powder.

It has probably been noticed by others, as well as myself, that many medical men have preferred the comp. pill of the Edinburgh Pharmacopœia to the com-

* *Annales de Chemie et de Physique*, xxxv., 274.
† *Annalen der Chemie und Pharmacie*, ix., 68.
‡ *Annalen der Chemie und Pharmacie*, xxvii., 155.
§ Vol. xii., p. 272.

pound extract of our Pharmacopœia of 1836, the article now commonly in use,* and supposing there may be some ground for this preference I have been led to consider in what the difference consists.

In the first place it may be noticed that the ingredients in the Edinburgh preparation are concentrated by spirit being used to form them into a mass, whereas the hard soap and the water necessarily retained to make the mass of comp. ext. of pill consistence amounts to twenty-five per cent. But I believe a more important difference consists in the larger proportion of scammony used in the Edinburgh formula.

From the introduction of compound extract of colocynth under the name of Extractum Panchymagogum, and of compound colocynth pill under the title of Pilulæ Cochiæ: the proportion of aloes to scammony in the former has not usually exceeded one scammony to three of aloes, while the compound designated pill usually maintained the proportion of equal parts of the two ingredients. The recent Pharmacopœia of the Dublin College has broken through this arrangement, and dropped its formula for extract. At the same time it has altered the proportion of scammony and aloes in its formula for pill to one of the former and two of the latter, settling the difference as it were by compromise. I believe the preference given to the Edinburgh pill arises principally from the greater proportion of scammony which it contains, and I would venture to suggest that the proportion of this ingredient ought to be increased in our next Pharmacopœia.

The dose of scammony is stated by our authorities to be equal to or greater than that of aloes, and the combination of medicines in parts proportioned to their approved doses, appears to be reasonable.

Scammony is a mild medicine, producing no sensible effect except in considerable doses, and from the very small proportion in which it is directed to be used, as well as from the impurites of the average quality of scammony,† I am doubtful if its effects in the compound extract are generally appreciable, and I believe it might be wholly omitted without attracting the notice of the medical prescriber or his patients.

After the foregoing observations, I venture to suggest the following as a formula for Compound Colocynth Pill, simply with a view of bringing the subject under notice:—

Resin of colocynth in powder	1½ drm. or 2 drms.
Powdered hepatic, or Socotrine aloes	2½ oz.
Powdered scammony	1½ oz.
Powdered cardamoms	2 drms.
Olive oil, soft soap	6 drms.

Mix the powders, and add about one-third of them to the soap; rub into a paste, add the rest of the powder and beat into a mass.

The substitution of soft for hard soap in the recent Pharmacopœia, is, I think, an improvement. It lessens the proportion of inactive material, and the deliquescent quality of a soap made by potass, has a tendency to prevent the mass becoming hard.

Having recommended the introduction of colocynth resin as an article of the Materia Medica, it may be well before concluding, to add a few remarks respecting it.

According to Meissner's analysis, the pith of colocynth contains 27.6 per cent. of resin, 14.4 of which are soluble in ether. He considered the ethereal resin only as colocynthine, or the active principle of colocynth, but more recent authorities speak of the whole of the alcoholic product as colocynthine. I have ascertained by experiment, that the ethereal resin requires 100 parts of water for solution, while the part insoluble in ether, dissolves in twenty parts of water.

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* Our sale for the pill of 1851 does not amount to one per cent. of our sale for extract.

† See *Pharm. Journ.*, vol. x., p. 225.

Supposing the ethereal resin to be equally difficult of solution as it exists in the colocynth, it would require water to the amount of fourteen times the weight of the pith to extract it. It is, however, probably combined by nature with substances that increase its solubility.

The circumstance of colocynth resin being wholly soluble in rectified spirit, and only half of it in ether, affords a tolerably good test of its genuineness, which might be useful if the article were purchased, but it is presumed Pharmaceutical Chemists in general would prefer making it in their own laboratories.

OZONE.

BY C. F. SCHÖNBEIN.

(*Continued from page* 221.)

Disozonization or Conversion of Ozonized Oxygen into ordinary Oxygen.—When oxygen that has been partly ozonized by the electric spark is passed through a narrow glass tube at a high temperature it again becomes inodorous, and at the same time looses the property of producing a blue colour in the test paper, as well as all the other properties of ozonized oxygen. In other words the ozonized oxygen is converted into the ordinary condition.

The conversion of oxygen from one condition to the other is best shown by passing a stream of oxygen gas through a long narrow glass tube, in one part of which a rapid succession of electric sparks is kept up by means of an induction apparatus.

The gas issuing from this tube would, under these conditions, be ozonized and present the characteristic properties of ozonized oxygen. But when the tube is heated at the end where the gas issues, the oxygen appears in its ordinary condition, and again in the ozonized state after the tube has cooled. The same experiment may be made with atmospheric air ozonized by phosphorus.

If atmospheric air contain the hydrate of ozonized oxygen, HO_3, and not pure ozonized oxygen, it would be necessary to assume that the influence of heat is two-fold; in the first case producing a decomposition of this hydrate or superoxide into water and ozonized oxygen, and then converting the latter into ordinary oxygen.

The temperature at which the conversion of ozonized oxygen into ordinary oxygen takes place has not yet been determined with accuracy. According to my observations on this point it is certainly below a dull red heat.

Physical Characters of Ozonized Oxygen.

Aggregation.—As it has not yet been possible to prepare pure ozonized oxygen, but only mixtures of it with ordinary oxygen, hydrogen, or nitrogen, of which it forms a very small fraction, nothing is known as regards its density, &c.; but from the circumstance that these mixtures retain their odour at very low temperatures, and still present their peculiar chemical characters, it may be inferred that it is permanently gaseous.

It is not improbable that the conversion of oxygen from one condition to the other may be attended with an alteration of the density, since such a change takes place in all known instances of allotropic modification. It is therefore much to be desired, in a theoretical point of view, that the density of ozonized oxygen should be ascertained with certainty in some manner.

Voltaic Phenomena.—The ozonized oxygen presents, in its electromotic relations, the greatest analogy with chlorine, bromine, iodine, the peroxides of manganese, lead, silver, &c.; for when a strip of clean platinum is held only for a few seconds in ordinary oxygen or atmospheric air, strongly impregnated with ozonized oxygen, the metal is negatively polarized, as may be ascertained by means of a delicate galvanometer.

Magnetic Phenomena.—Ordinary oxygen is paramagnetic, analogous to iron. It is *à priori* probable that ozonization is accompanied by an alteration in the magnetic condition of oxygen, and there are facts which lead to the inference that ozonized oxygen is diamagnetic like chlorine, bromine, and iodine; but this point has not been determined experimentally.

Optical Phenomena.—With regard likewise to the optical relations of ozonized oxygen nothing is known, but there are some reasons for the opinion that it is coloured, like chlorine, bromine, and iodine.

Physiological Characters of Ozonized Oxygen.

The odour of ozonized oxygen in its most concentrated state is similar to that of chlorine, and approximates a little to that of nitrous acid. Air strongly ozonized by phosphorus, when breathed, oppresses respiration, produces temporary constriction of the chest, and irritates and inflames the mucus membrane. Small animals, such as mice, soon die in such an atmosphere. A full grown rabbit that had inhaled ozonized air for an hour died from the effects of the experiment, with symptoms similar to those accompanying poisoning by chlorine.

According to a calculation which I made, this rabbit could not during the hour have inhaled more than two milligramms of ozonized oxygen, whence it is evident that pure ozonized oxygen must be a highly poisonous substance, in which animal life would be almost instantaneously destroyed.

Chemical Characters of Ozone.

The chemical relations of the substance cannot be better described than by stating that it is the most energetic oxidizing agent known. The greater number of substances, simple or compound, which are capable of combining with oxygen, are oxidized by it, even at the ordinary temperature.

1. *Hydrogen* does not appear to combine with ozonized oxygen at the ordinary temperature, as may be inferred from the fact, that this gas, mixed with ozonized air, does not destroy the odour peculiar to the ozonized oxygen, however long the gases may be kept in contact in a stoppered vessel. The case is different with hydrogen in certain states of combination—sulphuretted hydrogen, &c.

2. *Carbon.*—When strongly ozonized air or oxygen is passed through a tube filled with pure charcoal in fine powder, the gas issues from the tube inodorous and perfectly disozonized, but without any recognizable quantity of carbonic acid.

I have not yet been able to ascertain into what state of combination the oxygen enters with the carbon. The charcoal does not appear in the slightest degree different after the experiment, and it would appear that charcoal has the power, by mere contact, to convert ozonized into ordinary oxygen. This appears likewise to take place with Thenard's peroxide of hydrogen, which I consider to be a hydrate of ozonized oxygen, and which is converted by charcoal into water and ordinary oxygen without any formation of carbonic acid.

3. *Sulphur and Selenium.*—Ozonized oxygen appears to exercise as little influence upon these substances as upon free hydrogen, for I have not found by shaking them in the powdered state with ozonized air that the odour is removed, or that the extraordinary oxidizing influence is destroyed.

4. *Phosphorus.*—Both modifications of this substance are oxidized by ozonized oxygen at the ordinary temperature, first to phosphorous acid, then to phosphoric acid. The effect is produced much more rapidly with ordinary phosphorus than with the red modification. During the oxidation of the former both heat and light are generated. In pure ozonized oxygen ordinary phosphorus would doubtless burn at the ordinary temperature, as it does in chlorine. The ignition of phosphorus in a mixture of hydrogen with oxygen, and at the ordinary temperature, in atmospheric air, when suddenly rarefied, is owing to the production of ozonized oxygen and the generation of heat consequent upon the combination of the oxygen and phosphorus.

I have never found that the red modification of phosphorus becomes luminous in the dark, even when finely powdered and in contact with highly ozonized air, although a slow oxidation does take place.

5. *Iodine*, *Bromine*, and *Chlorine.*—Ozonized oxygen appears to enter into combination with these substances, producing compounds similar to those which they form with each other, and which are not iodic, bromic and chloric acids, but possess powerful bleaching properties.

The iodine compound is solid, at a low temperature crystalline, and of a yellowish-white colour; at the ordinary temperature it volatilizes rapidly; the vapour smells very like chloride of iodine, and excites tears. Treated with water it is converted into iodic acid and free iodine, which accounts for the fact, that an aqueous solution of iodine is decolorized when shaken with ozonized oxygen and iodic acid formed. All substances that combine readily with oxygen immediately separate iodine from this compound, just as they do from chloride of iodine.

This reaction may be observed most conveniently in the following manner:—

A strip of white bibulous paper is saturated with a fresh alcoholic solution of iodine nearly dried in the air, and introduced into a large flask containing highly ozonized air. The brown colour rapidly disappears from the paper, and again reappears when the paper is rubbed with phosphorus, zinc, lead, copper, &c., or immersed in air, slightly impregnated with sulphurous acid or sulphide of hydrogen, in consequence of the liberation of iodine by the zinc, &c. When the bleached strips are left in the air only for a short time they lose their smell, and the brown colour is not reproduced by zinc, &c., since the ozonized iodine evaporates. This reaction suffices to prove that the decoloration of the iodized strips in ozonized oxygen is not owing to the formation of iodic acid, since this substance is both fixed and inodorous.

When the decolorized odorous strips are introduced into a flask it is soon filled with the vapour of ozonized iodine, and when, after removing the paper, a little water is shaken about in the flask it becomes brown, and contains iodic acid.

On account of the great volatility of ozonized iodine the above experiments succeed better in cold than in warm weather. At a temperature some degrees below 32° F. the decolorized iodine paper is seen even by the naked eye to be covered with innumerable small crystals, which are soon volatilized.

When the iodized paper is introduced into air containing chlorine or bromine, phenomena present themselves similar to those described ; the paper is bleached, acquiring the odour of chloride or bromide of iodine, becomes brown by contact with zinc, &c., and loses this property when exposed to the air for a time. There is, therefore, a great analogy between chloride and bromide of iodine, and the crystalline compound of iodine with ozonized oxygen.

It is very deserving of notice, and, as it appears to me, of special interest in a theoretical point of view, that the ozonized oxygen does not produce iodic acid but a neutral volatile substance, whence it may be inferred that the condition of the oxygen in these substances is different.

6. *Nitrogen.*—Even in the uncombined state this substance is oxidized by ozonized oxygen to nitric acid. When atmospheric air, highly ozonized by phosphorus, is shaken with lime-water or a solution of soda, the ozonized oxygen disappears, and nitrate of the base is found in solution. Ozonized oxygen is therefore capable of oxidizing nitrogen in the presence of a strong base, which ordinary oxygen is not.

The nitric which is produced, according to my observations, during the slow combustion of phosphorus in atmospheric air, and according to the observations of Cavendish and Davy, by electrical discharges in air and in the electrolysis of water containing nitrogen in solution, I consider to originate from the oxidation of nitrogen by the ozonized oxygen always produced under these several conditions.

I have no doubt that the traces of nitric acid present in the atmosphere and in rain-water have a similar origin, and am inclined to the opinion that nitrogen can be oxidized only by ozonized oxygen, and that this form of oxygen plays an important part in the process of nitrification.

7. *Metals.*—With the exception of gold and platinum all the more known metals are oxidized even at a low temperature by ozonized oxygen, as is evident from the fact that when the powder is shaken with the gas it almost immediately becomes inodorous, and loses the other characters of ozonized oxygen. The metals are oxidized to the extreme limit—lead and silver to peroxides, arsenic to arsenic acid.

Even in compact masses the metals are oxidized by ozonized oxygen, especially silver. When a polished strip of pure silver is suspended by a platinum wire in ozonized oxygen it gradually becomes covered with a black crust which is easily detached, and at the same time the ozonized oxygen disappears. The substance of the black crust is peroxide of silver (AgO_2). The oxidation of the silver is facilitated by moisture.

Under the same conditions lead is covered with a brown crust of peroxide (PbO_2).

The arsenic separated from arsenide of hydrogen by heat is oxidized by ozonized oxygen much more rapidly than antimony obtained in a similar manner, and the different behaviour of these substances may serve to distinguish between them. The antimony spots in contact with highly ozonized oxygen do not lose their metallic lustre until some days have elapsed, while the arsenic spots disappear within fifteen or twenty minutes. The former leave white spots of antimonic acid, while the latter leave deliquescent arsenic acid, that may easily be recognized by the taste and by its action on litmus paper.

(*To be continued.*)

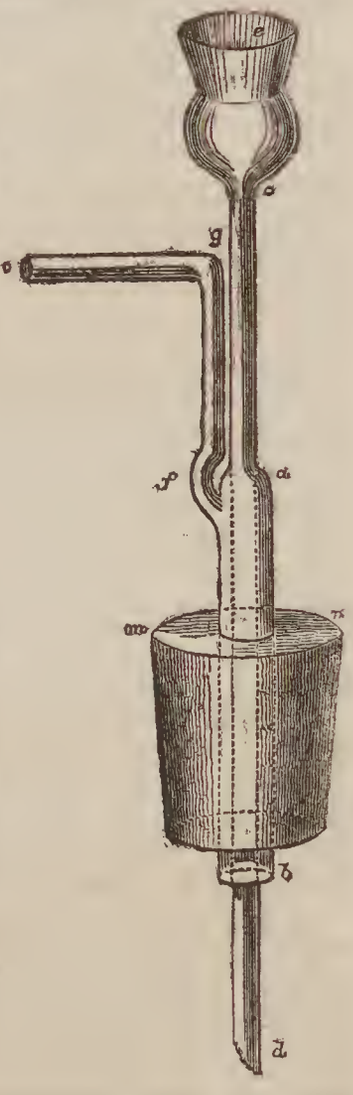
IMPROVED MOUTH BLOWPIPE.

M. S. DE LUCA* has constructed a very convenient form of mouth blowpipe, which admits of the cheek muscles being rested for a moment, and air being inhaled through the mouth without interrupting the flame. This is effected by introducing between the mouth-piece and the box for collecting moisture a bulb of vulcanized caoutchouc, as shown in the figure. The escape of air when the mouth is removed is prevented by a valve at *A* opening outwards. The caoutchouc bulb is fastened by ivory collars upon the tubes *D* and *H*, the projecting ends of which are connected by means of a light metal rod.

CHIRONIA CHILENSIS. WILLD. *CANCHALAGUA.*

LEBEUF† has published an account of this plant, the *Erythræa chilensis* of Lamark. It is a native of Chili and Peru, and is called by the people *Cochan lahuen*, or *Cachen-laguen*, and has been introduced into the Spanish Pharmacopœia under the name of *Canchalagua*.

The plant was made known in 1707 by Le Pas, a French Physician, and was afterwards treated of by several authors. Dr. Chapa, of Bardos, near Bayonne, has made some experiments with it, the results of which are that it tends to reduce the plasticity of the blood, exercises a tonic influence upon the digestive organs, excites the urinary secretion and the action of the skin, and has besides febrifuge properties.



It may be administered as infusion or extract. The author has likewise prepared a wine, by extracting two kilogrammes of the plant, free from roots, with eight litres of water during twenty-four hours, then drawing off eight litres of liquid by displacement, and adding to it one litre of orange alcohol. The wine thus prepared is remarkably bitter.

The author is of opinion that this plant is deserving of notice as a possible substitute for quinine.

NEW FORM OF FUNNEL TUBE FOR GAS GENERATORS.

A. VOGEL‡ has contrived a combination of the funnel tube and delivery tube, which seems likely to prove serviceable. Upon an ordinary funnel tube, *e d*, is joined a short piece of wider tube, *a b*, furnished with a short bent tube, *f g o*. The tube *a b* is fitted into the cork of the generating vessel, and the acid added through the funnel tube reaching to the bottom of the vessel. The gas disengaged escapes through *a b* and its continuation *f g o*, whence it may be led in any desired direction by a tube connected to *o* with caoutchouc.

The same construction may be applied to washing flasks or vessels into which a gas is to be led, by substituting for the funnel tube a plain one with a rectangular bend at *c*, which will admit of its being connected with the generator.

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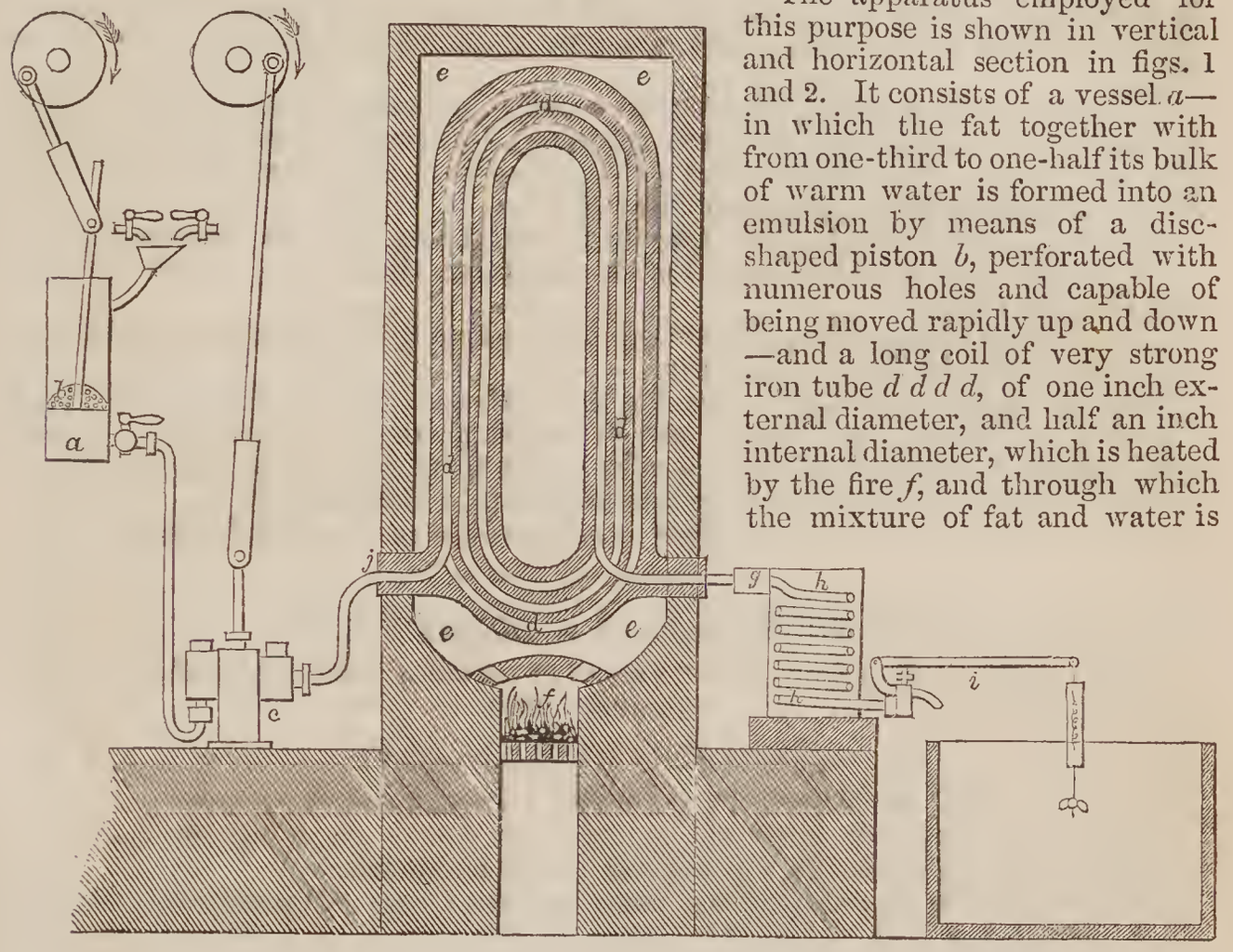
* *L'Institut*, 1854, No. 1054.
† *Journ. de Pharm. et de Chimie*, xxv., 434.
‡ Buchner's *Neues Repertorium*, iii., 241.

NEW PROCESS FOR THE PREPARATION OF FAT ACIDS, &c.

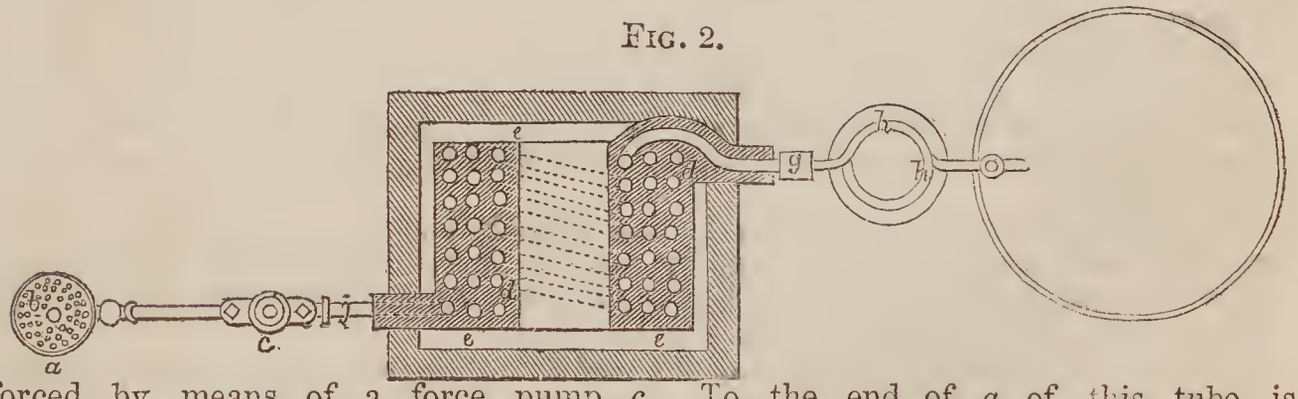
Mr. Tilghman has recently patented a process for the preparation of fat acids and soap. It consists in exposing the fats mixed with water to the joint influence of an elevated temperature and pressure. By this means the separation of the fat acids from the glycerine is stated to be complete. Fats which, like palm oil, are highly coloured, are said to be partially bleached by this treatment, and those which have a strong smell to be more or less deprived of it.

Fig. 1.



The apparatus employed for this purpose is shown in vertical and horizontal section in figs. 1 and 2. It consists of a vessel *a*—in which the fat together with from one-third to one-half its bulk of warm water is formed into an emulsion by means of a disc-shaped piston *b*, perforated with numerous holes and capable of being moved rapidly up and down—and a long coil of very strong iron tube *d d d d*, of one inch external diameter, and half an inch internal diameter, which is heated by the fire *f*, and through which the mixture of fat and water is

Fig. 2.



forced by means of a force pump *c*. To the end of *g* of this tube is attached another coil, *h h*, which is immersed in cold water, and the discharge end of this tube is furnished with a valve *i*, capable of being loaded in such a way, that when the heating tubes *d d d* are at the desired working temperature, and the pump *c* is not in action, it will not be opened by the internal pressure produced by the application of heat to the mixture of fat and water. The coils of tube should be kept entirely full of the mixture, and when the contents of *d d* have been sufficiently acted upon, it is displaced by a fresh supply introduced by means of the force pump *c*, and driven through the cooling tubes *h h*, escaping from the apparatus by the valve *i*, perfectly decomposed into free fat acid and solution of glycerine.

The time required for the decomposition of the neutral fats under these conditions

is said to be about ten minutes. The temperature, it appears, may vary between tolerably wide limits, the melting point of lead giving generally good results, while some fats, such as palm oil, experience the same change at the melting point of bismuth, and a temperature considerably above the melting point of lead has not been found detrimental.

The thermometer used consists of a series of tubes, half an inch in diameter and about three inches deep, bored into solid portions of the iron casting surrounding the tubes *d d*, and filled with substances whose melting point is known. The series employed by Mr. Tilghman is tin melting, at 440° F.; bismuth, at 510° F.; lead, at 612° F.; and nitrate of potash, at 660° F. The temperature of the apparatus may be observed by means of this arrangement by dipping a piece of straight iron rod into these tubes successively, so as to ascertain which of their contents are in a liquid state.

It is stated to be essential, both for the rapidity and completeness of the decomposition, that the fat and water should remain in intimate mixture while traversing the tube *d d*, and therefore the tube coil is placed in a vertical position, so that the tendency to separation may be counteracted.

The pressure required in the operation is said to be under two thousand pounds on the square inch, and the strength of the apparatus should be tested by a pressure five times as great.

The mixture of fat acids and solution of glycerine are separated by subsidence, and then treated in the usual manner.

The same apparatus may be used for the fabrication of soap, by substituting for the water a solution of carbonated alkali, and subjecting the mixture to the same treatment as in the production of fat acids. The temperature requisite for the production of soap lies between the melting points of tin and bismuth.

Abstract of Specification, sealed 25th March, 1854.

ON CHARCOAL AS A DISINFECTANT.

Being a Letter to the Editor of the "Times," as published in that Journal on the 22nd November, 1854.

BY DR. JOHN STENHOUSE, F.R.S.,

Lecturer on Chemistry at St. Bartholomew's Hospital, London.

The great efficacy of wood and animal charcoal in absorbing effluvia and the greater number of gases and vapours, has long been known.

Charcoal powder has also, during many centuries, been advantageously employed as a filter for putrid water, the object in view being to deprive the water of numerous organic impurities diffused through it, which exert injurious effects on the animal economy.

It is certainly somewhat remarkable, that the very obvious application of a perfectly similar operation to the still rarer fluid in which we live—namely, the air, which not unfrequently contains even more noxious organic impurities floating in it than those present in water, should have, up till February last, been so unaccountably overlooked.

Charcoal not only absorbs effluvia and gaseous bodies, but, especially when in contact with atmospheric air, rapidly oxidizes and destroys many of the easily alterable ones, by resolving them into the simplest combinations they are capable of forming, which are chiefly water and carbonic acid.

It is on this oxidizing property of charcoal as well as on its absorbent power that its efficacy as a deodorizing and disinfecting agent chiefly depends.

Effluvia and miasmata are usually regarded as highly organized, nitrogenous, easily alterable bodies. When these are absorbed by charcoal, they come in contact with highly condensed oxygen gas, which exists within the pores of all charcoal which has been exposed to the air, even for a few minutes; in this way they are oxidized and destroyed. My attention has been specially directed for nearly a twelvemonth to the deodorizing and disinfecting properties of charcoal, and I have made an immense number of experiments on this subject.

On the 22nd of February last I brought the subject before the Society of Arts, and on that occasion exhibited a specimen of a charcoal respirator, and the mode of employing it. I likewise dwelt at some length on the utility of charcoal powder as

a means of preventing the escape of noxious effluvia from churchyards, and from dead bodies on board ship and in other situations.

On the 9th of June last I also, in a letter to the Society of Arts, proposed to employ charcoal ventilators, consisting of a thin layer of charcoal enclosed between two sheets of wire gauze, to purify the foul air which is apt to accumulate in water-closets, in the close wards of hospitals, and in the impure atmospheres of many of the back courts and mews-lanes of large cities, all the impurities being absorbed and retained by the charcoal, while a current of pure air alone is admitted into the neighbouring apartments.

In this way pure air is obtained from exceedingly impure sources. Such an arrangement as this, carried out on a pretty large scale, would be especially useful to persons necessitated to live in pestiferous districts within the tropics, where the miasmata of ague, yellow fever, and other diseases are prevalent.

The proper amount of air required by houses in such situations might be admitted through sheets of wire gauze or coarse canvas, containing a thin layer of coarse charcoal powder.

Under such circumstances also pillows stuffed with powdered charcoal, and bed coverlets having the same material quilted into them, could not fail to prove highly beneficial.

A tolerably thick charcoal ventilator, such as I have just described, could be very advantageously applied to the gully-holes of our common sewers, and to the sinks in private dwellings, the foul water in both cases being carried into the drain by means of tolerably wide syphon pipes, retaining always about a couple of inches of water.

Such an arrangement would effectually prevent the escape of any effluvia, would be easy of construction, and not likely to get soon out of order.

The charcoal respirators to which I have already referred, and to which I should wish to draw especial attention, are of three kinds.

The first form of the respirator is constructed for the mouth alone, and does not differ in appearance from an ordinary respirator, but is only half its weight, and about one-fifth of its price.

The air is made to pass through a quarter of an inch of coarsely powdered charcoal, retained in its place by two sheets of silvered wire gauze covered over with thin woollen cloth, by which means its temperature is greatly increased. This charcoal respirator possesses several advantages over the respirators ordinarily in use :—

1st. Where the breath is at all fetid, which is usually the case in diseases of the chest, under many forms of dyspepsia, &c., the disagreeable effluvia are absorbed by the charcoal, so that comparatively pure air alone is inspired. This, I think, may occasionally exert a beneficial influence on diseases of the throat and lungs.

2nd. The charcoal respirator for the mouth alone will certainly prove highly useful in poisonous atmospheres, where miasmata abound, if the simple precaution is only observed of inspiring the air by the mouth and expiring it by the nostrils.

The second form of respirator is ori-nasal—that is, embracing both the mouth and the nose. It is only very slightly larger than the one already described, and does not cover the nose as the ordinary ori-nasal respirator does, but merely touches its lower extremity, to which it is adapted by means of a piece of flexible metal covered with soft leather. When this respirator is worn no air enters the lungs without first passing through the charcoal, and any effluvia or miasmata contained in the atmosphere are absorbed and oxidized by the charcoal. This form of the respirator, therefore, is peculiarly adapted for protecting the wearer against fevers and other infectious diseases.

The third form of the respirator is also ori-nasal, but is much larger, and therefore more cumbrous than the preceding variety. It is intended chiefly for use in chemical works, common sewers, &c., to protect the workmen from the noxious effects of the deleterious gases to which they are frequently exposed.

I think it but justice to myself to state, that I have no pecuniary interest in any of these respirators. Though strongly urged to do so, I refrained from securing them by patent, on the ground that inventions for the prevention of death and disease ought to be sold at the lowest possible price, and should not, therefore, be encumbered with the expense and restrictions attendant upon patent rights. These respirators have been very successfully manufactured by Mr. W. B. Roof, of 8,

Willow Walk, Kentish Town, who sells the one for the mouth alone at 6*s.*; the small ori-nasal at 8*s.*; and the large ori-nasal at 10*s.* each.

I am aware that some persons, who admit the deodorizing properties of charcoal, deny that it acts as a disinfectant. I would direct the attention of such persons to the following statement of facts:—About a year ago the bodies of a full-grown cat and two rats were placed in open pans, and covered by two inches of powdered charcoal. The pans have stood during all that time in my laboratory, and though it is generally very warm, not the slightest smell has ever been perceptible, nor have any injurious effects been experienced by any of the nine or ten persons by whom the laboratory is daily frequented.

Now, had the body of these animals been left to putrify under ordinary circumstances, not only would the stench emitted have been intolerable, but some of the persons would certainly have been struck down by fever or other malignant disorders. Within the last few months charcoal powder has been most successfully employed both at St. Mary's and St. Bartholomew's Hospitals, to arrest the progress of gangrene and other putrid sores. The charcoal does not require to be put immediately in contact with the sores, but is placed above the dressings, not unfrequently quilted loosely into a little cotton wool. In many cases patients who were rapidly sinking have been restored to health.

In the instance of hospital gangrene, we have to deal not only with effluvia, but also with real miasmata; for, as is well known, the poisonous gases emitted by gangrenous sores not only affect the individual with whom the mischief has originated, but readily infect the perfectly healthy wounds of any individuals who may happen to be in its vicinity. So that in this way gangrene has been known to spread not only through one ward, but through several wards of the same hospital.

Within the last few weeks the dissecting room at St. Bartholomew's Hospital has been perfectly deodorized by means of a few trays filled with a thin layer of freshly heated wood charcoal. A similar arrangement will, in all probability, be likewise soon applied to the wards of St. Bartholomew's, and every other well-conducted hospital.

From these and other considerations, therefore, I feel perfectly confident that charcoal will prove by far the cheapest and best disinfectant.

Unlike many other disinfectants, it evolves no disagreeable vapours, and if heated in close vessels, will always act, however long it has been in use, quite as effectively as at first.

If our soldiers and sailors, therefore, when placed in unhealthy situations, were furnished with charcoal respirators, such as the second form above described, and if the floors of the tents and the lower decks of ships were covered by a thin layer of freshly burnt wood charcoal, I think we could have little in future to apprehend from the ravages of cholera, yellow fever, and similar diseases by which our forces have of late been decimated. If found more convenient, the charcoal powder might be covered with coarse canvas, without its disinfectant properties being materially impaired.

The efficiency of the charcoal may be greatly increased by making it red-hot before using it. This can easily be done by heating it in an iron saucepan covered by an iron lid.

When the charcoal is to be applied to inflammable substances, such as wooden floors, &c., of course it must be allowed to cool in close vessels before being used.

[Two or three additional sentences have been added, but all the rest of the Letter remains exactly as it appeared in the *Times* of the 22nd November last.

IMPROVEMENT IN THE MANUFACTURE OF BAKERS' YEAST.

BY M. C. GUTKIND, *of Paris.*

The new method consists in completely saccharifying the starch contained in barley. The barley is slightly malted, dried in a rapid current of warm air, taking care to prevent smoke coming in contact with the grain. The malt thus prepared is reduced to the condition of the finest flour possible, without bolting it; that is, the flour and bran should not be separated. This flour is introduced into a vat, the size of which varies according to the quantity of yeast intended to be prepared at each operation. Water at a temperature of 40° Centigrade (104° Fahr.) is intro-

duced into the vat sufficient to make the flour into dough like that for making bread; this dough is then diluted with a further quantity of water, at the same temperature, to the consistence of porridge. M. Gutkind prefers using, for every 100 killogrammes of flour (= 220.48 lbs.), 2 hectolitres (= 44 gallons) of warm water. When the porridge is made, it is introduced into a boiler, where it is gradually heated to 81° Centigrade (= 177.8 Fahr.). As soon as it reaches this temperature, the fire or steam, whichever be employed, is arrested, in order that the temperature of the porridge, become sensibly more fluid, may not pass that degree.

The liquid mass is now introduced into bags of canvas, and submitted to the action of a press, by which the essentially liquid portion, which is very saccharine, is squeezed out; this liquid is kept in large vats, where it cools. The solid matter remaining in the bags is again placed in a vat, and treated with a fresh quantity of water at 114° Fahr., in the proportion of 111 gallons of water to 441 lbs. of residue. The mixture is stirred so as to form a porridge, which is re-introduced into the boiler, and heated to a temperature of 201° Fahr., at which it is maintained for one hour. The mass is then pressed as before in bags of coarse canvas; but it is rich in nitrogenous compounds, which form the base of the yeast. The liquors resulting from both operations are mixed together, and are exposed to the action of the air in large uncovered vats during two, three, and even for ten days, according to the external temperature.

This exposure to the air is one of the chief points in the new method. In order to set the liquid in fermentation, it is re-warmed to a temperature of 89.6° Fahr., and a small quantity of fresh yeast stirred up in a little warm water added. The fermentation sets in very soon, and may be conducted either in barrels or in vats, around which a temperature of 59° Fahr. should be maintained during the whole operation.

The yeast obtained by means of this process possesses the following properties:—1. The *raising* power is much superior to that of all other yeast; 2. It has no bitter or acid taste, and consequently is admirably adapted for pastry work; and 3. It is of an extreme whiteness, and consequently does not require to be washed—hence it preserves all its force.

The residue remaining after the fermentation may be employed to make vinegar. —*Le Genie Industrial*, June, 1854.

OBSERVATIONS ON THE ANTIMONIAL POWDER OF THE LAST DUBLIN PHARMACOPŒIA (1850),

And on the Medical Effects of the Teroxide of Antimony.

BY JONATHAN OSBORNE, M.D.,

King's Professor of Materia Medica, Physician to Mercer's Hospital, &c.*

It is well known that the antimonial powder of the Pharmacopœias was first adopted as an imitation of Dr. James's fever powder, but the opinion has for a long time been gaining ground among practitioners that it is nearly, if not altogether, inert. I have given it in various doses, large and small, and long ago made a series of trials expressly on this subject, but could never perceive any sensible effect except when combined with calomel. A powder of two grains of calomel and four of antimonial powder, taken at night, was not unfrequently followed by perspiration; but when given alone it never appeared to me to have any effect, and I am thus fully enabled to confirm the statements as to its inefficiency, made by Mr. Hawkins, Dr. Duncan, and Dr. Elliotson.

That it should be thus inactive may be explained from the fact that the antimony is almost entirely in the form of antimonious acid, and that the proportion of teroxide of antimony it contains is insignificant, never amounting to four per cent., according to Dr. Maclagan, and totally absent in some samples, according to the experiments of Mr. Phillips.

In the *Philosophical Transactions* for 1801, Mr. Chenevix described a mode of preparing antimonial powder in the humid way, in which teroxide of antimony was precipitated from the hydrochlorate by ammonia. It was strange that although this process was referred to in terms of high commendation by almost all the

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* Read before the Association of the King and Queen's College of Physicians.

succeeding writers on pharmacy, and was admitted to possess the great advantage of uniformity of oxidation, of which the process by heat was unsusceptible, yet that it never was admitted into any of the Pharmacopœias. It was not till the publication of the last edition of the Dublin Pharmacopœia in 1850, that a mode of preparing the powder by precipitation appeared, and in this a great improvement was introduced by using tartar emetic instead of the solution in hydrochloric acid which Mr. Chenevix had employed. This preparation, however, though bearing the name of antimonial powder, is yet different from it in one respect, and that the most important, in all the antimony it contains being exclusively in the state of teroxide. It has therefore appeared to me desirable to ascertain its medical effects by actual experiment. The only account of the effect of the powder, as prepared by Mr. Chenevix, that I can find, is contained in the following words, with which his paper concludes:—"I gave some of my powder to Dr. Crichton, Dr. Babington, and Mr. Abernethy, gentlemen whose extensive practice and acknowledged skill sufficiently enabled them to judge of its medical properties. They all concur in opinion, that in its general effects it agrees with Dr. James's powder and the pulvis antimonialis, but that it is more mild, and consequently may be given in larger quantities, seldom producing nausea or vomiting, in doses of less than eight or ten grains." The results I have obtained are very different.

I have tried it in twenty cases, selected for careful observation in Sir Patrick Dun's Hospital. The powder was prepared according to the process of the Dublin Pharmacopœia, 1850, by Mr. Morgan, whose accuracy and ability are well known. The dose given in every instance was five grains in the evening and the same at bed-time. The cases were chiefly rheumatism, pneumonia, and bronchitis, and the patients were all adults. In order to present a view of the percentage of the effects, and to facilitate recollection and comparison with other observations, I have reduced them to the form of decimals.

TABLE *of the Effects of the Pulvis Antimonialis of the Dublin Pharmacopœia*, 1850. *Dose, five grains evening and night.*

More or less gentle Action on the Bowels.	Nausea.	Vomiting.	Perspiration.	Perspiration without Nausea.	No perceptible Effect.
.50	.45	.20	.65	.20	.10

In order to ascertain the effect of the teroxide of antimony taken separately, I tried some prepared by Mr. Morgan, according to the Dublin Pharmacopœia, 1850. It was given in three grain doses evening and night, and to the same average class of cases as the above, selected in Sir Patrick Dun's and Mercer's Hospitals.

TABLE *of the Effects of the Teroxide of Antimony (Algaroth's Powder), given in doses of three grains evening and night.*

More or less gentle Action on the Bowels.	Nausea.	Vomiting.	Perspiration.	Perspiration without Vomiting.	No perceptible Effect.
.60	.40	15	.70	.40	.05

In order to try how far the action of the teroxide could be influenced by the presence of acids, I selected six of the cases in which there had been no effect, or only perspiration, and added to each dose the same weight of nitric acid. The result was in every case either nausea, vomiting, or purging. Hence it appears that the teroxide is capable of combining with acids in the stomach, and of forming salts resembling tartar emetic. I find also that the addition of one or two grains to small doses of either rhubarb or aloes produces a remarkable augmentation of the purgative effect of these articles.

The conclusions to be deduced from my observations are :—

1st. That the antimonial powder of the present Dublin Pharmacopœia (1850) differs from that hitherto prepared, not only by containing the antimony exclusively in the state of teroxide, but by medical effects of which the older preparation is nearly if not entirely destitute.

2nd. That as it has not been identified by a distinct name (which is to be regretted), the prescriber should, to avoid confusion, always distinguish it as the antimonial powder of the Dublin Pharmacopœia of 1850.

3rd. That the teroxide of antimony (Algaroth's powder), inasmuch as it contains all the active part of antimonial powder, may be safely substituted for it, the phosphate of lime not contributing to its virtues, and having been at first accidentally associated with it in consequence of the imperfect chemistry of the time when the original process was devised.

4th. That the average maximum dose of the teroxide of antimony, as a diaphoretic for an adult, is three grains evening and night.

5th. That the addition of acids renders it more emetic and more purgative.

6th. That the occasionally violent effects ascribed to it by some of the older writers were most probably due to the presence of chloride of antimony, from want of care in the preparation, and that this may be most effectually excluded by precipitating it from tartar emetic by means of an alkaline solution.—*The Dublin Quarterly Journal of Medical Science.*

CRYSTALLINE ANHYDROUS PERSULPHATE OF IRON.

Mr. Hart* has met with this salt in the form of a crystalline deposit from sulphuric acid which had become contaminated with iron while cooling in the concentrating platinum retort. His analysis gave

	Found.	Calculation.
$Fe_2 O_3$	5.74	5.88
SO_3	8.84	8.83
Water	0.13	0.00
	14.71	14.71

He also succeeded in preparing the salt by adding protosulphate of iron to boiling concentrated sulphuric acid until it was no longer dissolved. On cooling, the persulphate of the above composition separates in minute crystalline scales.

He considers the reaction in this process to be

$$2\ (FeO,\ SO_3)+2\ SO_3=Fe_2O_3+3\ SO_3+SO_2.$$

ESTIMATION OF POTATO STARCH MIXED WITH WHEAT STARCH.

Cailletet† proposes to estimate potato starch, mixed with wheat starch, by observing the volume of the precipitate formed when a given weight of the starch, suspended in solution of potash, is mixed with an alcoholic solution of bromine; in virtue of the difference in the volume of the precipitates given under these circumstances by potato and wheat starch.

EARLY CLOSING.

"A Chemists and Druggists' Early Closing Association has been formed in Liverpool, under whose auspices the following notice has been extensively circulated, with upwards of sixty names attached:—"We, the undersigned, Chemists and Druggists of Liverpool, chiefly resident in the North End, and being contiguous to each other, do hereby agree jointly and severally to close our respective shops at the hour of nine o'clock, p.m., each night in the week (excepting Saturdays), on and after Monday, 4th of December; and further, that no light or other inducement be discernible from the exterior of our shops, evidencing special attention for late or stray customers; but we, the undersigned, Chemists and Druggists, do engage strictly and honourably to carry out this our covenant,—as witness our signatures."

A similar movement is in progress in Chichester, as will be seen by the following notice:—"Notice to the Public. Earlier closing of Chemists' Shops.—The under-

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* *Chemical Gazette*, Sept. 15th, 1854.

† *Comptes Rendus*, July 31, 1854.

signed having mutually agreed, beg most respectfully to inform the public, that on and after the 1st of January, 1855, their shops will be entirely closed at nine o'clock every night, Saturdays excepted. It is respectfully and earnestly requested, that in every possible case their friends will obtain their medicines, &c., during the ordinary hours of business—Pratt and Son, W. Phillipson, Samuel Reynolds, William Rowland, John Woods, Henry Brown, George Dale. Chichester, Dec. 20th, 1854."

We have received the following from a Correspondent at Bury St. Edmonds :—

Seeing in your Journal several letters from Druggists upon the subject of "Early Closing," I beg to state, that the Chemists and Druggists of this town have commenced closing their shops this winter at eight o'clock, P.M., instead of ten o'clock, P.M., as formerly (there being nine in the town), except one, who would not agree to do so; and who, in fact, can hardly be called a Chemist and Druggist, dealing chiefly in tobacco, pipes, chimney ornaments, and many other things quite foreign to the business, and consequently says, that his best custom is after eight o'clock, P.M., doing scarcely anything before that time. I can assure you, that we all feel it a great boon, being now able to study a little, which before was quite impossible. I may add, that the time for closing on Saturdays is not altered—namely, ten o'clock.

Dec. 11, 1854.

REVIEWS.

ENCYKLOPÄDIE DER MEDICINISCH-PHARMACEUTISCHEN NATURALIEN UND ROHWAARENKUNDE. *Mit besonderer Rücksicht auf historische und genetische Verhältnisse und auf physische und chemische Eigenschaften. Bearbeitet unter Mitwirkung des* Dr. JULIUS MARTINY, *Apotheker in Gaualgesheim von* Dr. med. EDUARD MARTINY, *Brunnenarzt zu Salzschlirf, Ehrenmitgliede und correspondirendem Mitgliede mehrerer gelerhten Gesellschaften.* In two volumes 8vo. Quedlinburg and Leipsic. 1843-1854.

IT is with much pleasure that we have at length received the concluding number of this valuable work, which we heartily wish existed in a shape more accessible to the generality of our readers.

Drs. Martiny's *Encyklopädie* forms two substantial octavo volumes, in which the subjects treated of are arranged alphabetically under their Latin names. The information regarding each article of the Materia Medica (and the number brought under notice is exceedingly comprehensive) is placed in the usual order of Synonyms, History, Botanical Origin, Physical Characters, Analysis, &c., Therapeutical properties and Uses being but slightly and incidentally noticed. The descriptions are generally accurate and minute, while abundant references to other writers testify an industry and desire for exactness which cannot be too much commended. We could wish, however, in some cases, that the learned authors had not so exclusively relied upon the statements of books, but that they had sought information by correspondence with those capable of affording it. It would not have been difficult to discover that the culture of Saffron in Cambridgeshire, Essex, and Norfolk, has long since ceased, and therefore that to assert, that *in England much and excellent Saffron is at the present time produced*, is far from being the fact.

On the other hand, the diligent research of our authors seems almost to have anticipated the general introduction of some drugs: this is the case with *Kousso*, of which, under the head *Flores Brayeræ*, an excellent notice appeared long before that substance could be said to have a place in the Materia Medica of civilized Europe. Another we may notice is *Cortex Malabathri*, a drug almost unknown to pharmacologists, yet one which has recently been imported in large quantities into the London market as a substitute for Chinese Cassia Lignea, which has been scarce. In English trade it is usually designated *Cassia Vera* or *Wild Cassia*, sometimes *Java Cassia;* it has been imported from Singapore, Batavia, Calcutta, Rotterdam, &c. Of its identity with Martiny's *Cortex Malabathri*, we have convinced ourselves by a comparison with his specimens. According to our observations it is best distinguished from the *True* or *Chinese Cassia Lignea* by affording a *mucilaginous* decoction, which the latter bark does not.

As an example of our authors' style we will, however, give their notice of this bark *in extenso*.

Cortex Malabathri; *Mutterzimmt* (Mother-cinnamon).

As we have already remarked, Mother-cinnamon is frequently confounded with Cassia Lignea, and called *Thick* or *Flat Cassia Lignea*, *Cassia Lignea plana vel crassa*.

The true mother-cinnamon is derived from *Cinnamomum Tamola*, N. ab Esenb. (*Laurus Tamola*, Ham. *Persea Tamola*, Spr.), a tree of the family *Laurineæ*, indigenous to Bengal, where it bears the native name of *Tadsch* or *Tädsch*. By some it has been erroneously regarded as the produce of *Cinnamomum albiflorum*, N. ab E. (*Laurus Soncaurium*, Hamilt. and *Laurus Sailyana*, Ham.).

Genuine mother-cinnamon must be regarded as a pharmacological rarity, which here and there, yet very seldom, may still be found in old drug warehouses and apothecaries' shops. It occurs mostly in flat or somewhat curled pieces of a few inches to a foot or more in length; its breadth is from half to one-and-a-half inches, and its thickness two to three lines.

The epidermis is wanting, and frequently the cortical substance also has been cut away. The surface of the latter appears as a tolerably smooth, here and there furrowed, dark cinnamon-brown layer, upon which darker, shining sap-channels [*glänzende Saftstreifen*] are sometimes observable. Many pieces of the bark are stained in places of a dirty blood-red colour. Internally, in structure and colour, mother-cinnamon resembles Culilawan Bark, but is somewhat more compact and hard. Its inner surface consists of a smooth liber of a cinnamon-colour marked with purple-red, the fracture is quite short and minutely splintery, tolerably even, and of a dark cinnamon-brown colour.

Mother-cinnamon has a weak odour of cinnamon and cloves, becoming much stronger when the bark is crushed. Its taste is mucilaginous, clove- and cinnamon-like, but not strong. In powder it is of a deep cinnamon-colour.

The behaviour of the bark with chemical reagents is detailed under the head *Cortex Cinnamomi*.

Without the advantages of an extensive maritime commerce, of constant and rapid communication with colonial possessions, or the opportunity of examining drugs immediately on their arrival from a foreign country, it is often a matter of surprise to us that German pharmacologists succeed in eliciting the amount of information which such a book as that under notice affords. It is true that we do not often find all that original information and statistics for which the *Elements of Materia Medica* of Pereira are remarkable; yet there is, nevertheless, a copiousness of historical and descriptive detail, for which we hardly know where else to look.

A System of Instruction in Quantitative Chemical Anaylsis. By Dr. C. Remigius Fresenius. Edited by J. L. Bullock, F. C. S. Second Edition.

The Use of the Blowpipe in the Qualitative and Quantitative Examination of Minerals, Ores, &c. By Professor Plattner and Dr. Sheridan Muspratt. Third Edition, revised and further enlarged.

These are new editions of works which are already known to many of our readers. But a few years ago there were no works of this class of any importance in the English language, and the increasing demand for such books, which has latterly sprung up, is convincing evidence of the progress which the study of Chemistry is making among us. The works under notice are both good of their sort, and the present editions are presumed to bring them up to the existing state of knowledge in reference to the subjects treated of.

The use of the Blowpipe in analysis is restricted in its application, and generally designed more as an adjunct to other means than as a method to be relied upon alone. Yet there are cases in which the indications thus obtained are not less satisfactory and conclusive, and they are more quickly produced, than those of analysis by the humid way. As a guide to the student, or a book of reference for the practical Chemist, the work of Plattner and Muspratt is well arranged, easy of comprehension, and complete in all its details.

That which cannot be effected in the way of analysis by means of the blowpipe, it is the object of Fresenius's work to indicate other means of accomplishing. This work treats of more generally applicable methods of analysis than the other, including the whole range of inorganic and organic Chemistry. It is intended, as its title expresses, as a *system of instruction* in quantitative analysis, and is better suited for the student, than as a work of reference for the practical Chemist. The constant occasion which there is to turn from one part of the book to another, in order to get at the whole of the process recommended in almost any analysis, is troublesome, and often renders the subject less intelligible than it would otherwise be. Of

course, the necessity for repetitions is thus avoided, and much space economised, but this is effected at the expense of perspicuity. The defect alluded to is not felt so much by the student who is following the work as a system of instruction, as it is by the Chemist, who refers to it for the method of operating in particular instances. Notwithstanding this defect, however, the book contains a great amount of valuable information, which is very systematically arranged. The Editor states in his Preface,—"Amongst the additions I may mention the introduction of volumetrical methods of determining the constituents of commercial articles, as being particularly valuable for economising time, and assisting in every way the practical Chemist." We must confess, however, that we have been disappointed in not finding the subject of volumetrical analysis more generally treated of.

Topografisk Öfversigt af Naturalster och Chemiska Præparater uti London Great Exhibition 1851, *förnämligast de i medicinskt och pharmaceutiskt Hänseende märvärdiga, af* Dr. N. P. Hamberg. Stockholm. 8vo, pp. 87. 1854.

(Topographical Review of the Natural Objects and Chemical Preparations in the London Great Exhibition of 1851, principally those worthy of remark in a Medical and Pharmaceutical point of view, by Dr. N. P. Hamberg.)

The Practitioner's Pharmacopœia and Universal Formulary; *containing* 2000 *Classified Prescriptions selected from the practice of the most eminent British and Foreign Medical Authorities. With an Abstract of the Three British Pharmacopœias, and much other useful information.* By John Foote, M.R.C.S., Lond., &c. London: Henry Renshaw, 356, Strand; and Simpkin, Marshall, and Co., Stationers' Hall Court, 1855.

TO CORRESPONDENTS.

E. B. (Dublin).—*Transparent soap* is made by dissolving soap in spirit of wine, and distilling off the spirit from the clear solution. The soap which is left will be transparent.

B. S.—We know of no means of separating "resin from a fixed oil in which it is dissolved, and both of which are soluble in alcohol and ether."

Quæsiter (Tamworth).—(1.) *German yeast* is the solid portion of yeast which has been separated by filtration through cloths and partially dried.—(2.) There is no complete work of the sort mentioned excepting De Candolle's, which is not yet finished.

J. R., M. P. S. (Totnes).—Noad's *Lectures on Electricity.*

J. W. R. M. (Cupar).—We have seen no published account of experiments on *anhydrous nitric acid* excepting that of Deville. The product, however, has been obtained by other Chemists according to Deville's process.

A. D.—Hancock and Co., of Goswell Mews, Goswell Road, are the manufacturers of vulcanized India-rubber tubing.

W. Y. X. (Laventhenaugh).—*Mithridate.* Confectio Damocratis of the London Ph., 1746. The formula will be found in Gray's *Supplement*, and Beasley's *Formulary*. The preparation is almost obsolete.

O. P. (North Shields).—Goddard's *Price Book*, 4*s.* 6*d.*

A Member wishes for a recipe for "*Egg powder.*"

F. P. B. Plymouth.—(1.) *Tinctura Quinæ Composita*, see vol. ii, p. 68.—(2.) Sulphate of manganese can only be successfully made on the large scale. For the process, see Gray's *Supplement.*—(3.) The colour referred to arises from the presence of a little permanganic acid. It is not permanent.

M. P. S. (Lincoln).—The several methods which have from time to time been suggested for expediting the preparation of mercurial ointment, will be noticed in the next number of this Journal.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. VIII.—FEBRUARY 1st, 1855.

THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

JUDGMENT was pronounced in this case on Friday, the 26th of January, as follows:—

Court of Queen's Bench, Westminster, 26th January, 1855.

(Present—LORD CAMPBELL, MR. JUSTICE COLERIDGE, MR. JUSTICE WIGHTMAN, and MR. JUSTICE CROMPTON.)

THE QUEEN *v.* THE REGISTRAR OF THE PHARMACEUTICAL SOCIETY.

JUDGMENT.

(*Transcript from Messrs. Hodges and Sons' Short-hand Notes, 99, Chancery Lane.*)

Lord Campbell.—The question raised by the special verdict is, Whether the Registrar did his duty in placing on the register of Pharmaceutical Chemists, made in November, 1853, the names of William Murdoch and John Abraham? The name of John Wright is also mentioned on the record, but as his title to be registered is the same as John Abraham's, he need not be further noticed. It is found that neither Murdoch nor Abraham were Members of the Pharmaceutical Society on the 30th of June, 1853, when the Act of Parliament of the 15th and 16th of Victoria, chapter 56, passed, nor had either of them been examined under that Aet; but each was in business on his own account as a Chemist: Murdoch before the 18th of February, 1843, the date of the Charter of Incorporation, and Abraham before the 30th of June, 1852, the date of the passing of the Act above mentioned—each had obtained a certificate of this faet and of being qualified for admission as a Member of the Pharmaceutical Society. Thereupon Murdoch's certificate was approved by the Council, and he was elected a Member of the Society; and Abraham having been registered as certified and qualified for admission according to certain bye-laws made in November, 1852, was afterwards elected a Member of the Pharmaceutical Society, under bye-laws made in May, 1853. Both names were afterwards placed on the Register of Pharmaceutical Chemists of November, 1853, above mentioned. Each was registered on the ground that he was a Member of the Society. The title of each to be a Member is derived in part from the Charter, and in part from the Bye-laws, and the matter to be decided, is, Whether the title of each was valid? By the Charter, the Society consisted of Members of four classes:—First, those who were Chemists on their own account at the date of the Charter; secondly, those who should have been examined as the Council should have deemed proper; thirdly, those who should have been certified to be duly qualified for admission; and, fourthly, those who should be elected as superintendents by the Council. Murdoch claimed to be in the first class, that is, a Chemist on his own account at the date of the Charter; Abraham claimed to be in the third class, that is, to have been certified to be duly qualified for admission; and as the Charter is declared by the first section of the Act to be in full force, except such parts as are so varied and repealed thereby, and as the provisions of the Charter relating to these two classes of Members are not varied or repealed by the Act, that part of the title of each claimant which depends on the Charter, is made good. The Legislature intended an examination to be, in general, the condition on which the Members were to be admitted, but some other classes had been made admissible by the Charter to prevent the displacement of existing interests, and the admissibility of the same classes was continued by the Act on the same principle, leaving the extent to which it should be carried to be regulated by Bye-laws, to be made under proper precautions. The remainder of the title of each of these claimants depended on the Bye-laws, Murdoch claiming under the Bye-laws

made under the Charter before the statute, and Abraham claiming under Bye-laws made after the statute. The Bye-laws under which Murdoch claims, are clear from any doubt. They were valid according to the Charter, and their validity was expressly continued by the second section of the Act—and under them, Murdoch was admitted as a Member, therefore his registration was right. The Bye-laws under which Abraham was admitted as a person certified to be duly qualified for admission were made after the passing of the Act, that is, in November, 1852, and May, 1853, and their validity depends on section 2 of the Act, empowering the Council of the Society to alter the Bye-laws of the Society made under the Charter, and to make new Bye-laws for the purposes contemplated by the Charter or the Act, subject to the proviso that the new Bye-laws, and the altered Bye-laws, should be confirmed by a Special General Meeting and the Secretary of State, and subject to the proviso that the existing Bye-laws should continue in force until the Annual Meeting of May, 1853. As the Bye-laws under which Abraham claimed were new Bye-laws, and not alterations of the existing Bye-laws, and as they were duly made and confirmed, we think they were valid under the powers granted by the Act, and were not restricted by the proviso continuing the existing Bye-laws until the Annual Meeting in 1853. Under these Abraham is found to have been duly admitted. Thus he also became a Member of the Society, and, if a Member, therefore entitled to be registered; for the Act makes no distinction between different classes of Members in respect of registration. The Registrar being bound by section 5, from time to time to make a complete register of all persons being Members of the Society, that is, Members at the time the register is made. The meaning of the term "Pharmaceutical Chemist" was the subject of some discussion, and the Act does not give any definition of it. The 6th section implies that a Pharmaceutical Chemist is a generic term under which a Member of the Society is comprised as a species. The 10th section implies that a person who has passed his examination without being elected a Member is another species, and these two species or classes are expressly declared by the Act to be entitled to be on the register of Pharmaceutical Chemists, any person not on that register being prohibited by the Act from using the title either of Pharmaceutical Chemist, or Member of the Society. To this extent the statute is clear, and this is sufficient for the decision of the present case. For these reasons we think that the Registrar is shown by the verdict to have done his duty, and judgment therefore must be for the Defendant.

THE BENEVOLENT FUND OF THE PHARMACEUTICAL SOCIETY.

For many months the business of the Society has been obstructed, its prosperity temporarily impeded, and the minds of the Members kept in a state of anxiety and suspense by the proceedings in the Court of Queen's Bench, now happily brought to a termination.

The Dinner on behalf of the Benevolent Fund, which was proposed at the last Anniversary, was postponed *sine die*, in anticipation of the settlement of the question at issue, and in the hope that a favourable decision, at no distant period, might afford a suitable occasion for a social meeting. The time has now arrived, and we are induced to renew the suggestion for a Benevolent Fund Dinner, in the belief that it will tend to restore confidence and harmony among the Members, and at the same time to promote a charitable object in which they are interested.

We have always considered that the Benevolent Fund possessed a twofold advantage, being a bond of union and a fund for the relief of distress; and there could not be a more propitious opportunity for a social meeting on its behalf than that afforded by the above decision of the Court of Queen's Bench, which has fully established the powers and authorities intended to be vested in the Society by the provisions of the Charter and the Pharmacy Act.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*)

Elected in January.

MEMBERS.

Appledore.....Hurdon, James
Birkenhead .....Turner, William Henry
Birmingham .....Sumner, William
Brixton .....Hunt, Richard
Hackney.....Thomas, John Jabez
Melbourne .....Francis, Henry
Newton Abbott .....Poulton, John
Selby .....Brown, George
Southampton .....Jennings, John Edgell
Stoke Newington .....Jefferson, Ebenezer Walker
Taunton .....Pring, Walter

MAJOR EXAMINATIONS.

Balkwill, Frederick Pryor.....Plymouth
Mercer, Nathan .....Liverpool
Robbins, John .....Launceston
Sturton, Richard .....Peterborough

MINOR EXAMINATIONS.

Amos, Daniel .....Canterbury
Cornelius, James .....Clapham
Cornell, William .....Ipswich
Gibbons, George .....Clifton
Player, Jacob Hart .....Bedford
Rayner, William .....Canterbury
Rowson, Henry.....Chester

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Batchelor, George Hicks W.	Mr. Watts	Chatham
Bishop, William	Mr. Gay	Stroud
Bradley, Edwin Silvester	Mr. Parker	Derby
Hinton, Archibald	Mr. Curtis	London

PHARMACEUTICAL MEETING,

Wednesday, Jan. 3rd, 1855,

MR. DAVENPORT, VICE-PRESIDENT, IN THE CHAIR.

Donations to the Library and Museum were announced as follows:—

The Journal of the Society of Arts, from the Society of Arts.
The Journal of the Photographic Society, from the Photographic Society.
The Literary Gazette, from the Publishers.
The Chemist, from Mr. Highley.
Bark of Gomphosia Chlorantha.
Copalche Bark, from Mr. Howard.

CONCENTRATED INFUSIONS.

On the re-opening of the discussion on Concentrated Infusions, Mr. Jacob Bell said, that when he suggested the subject as one which he thought likely to prove generally interesting to the Members of the Society, it was not with the intention of taking a prominent part in it himself. He thought it probable that several Members who had given much attention to the subject would have taken it up and laid specimens on the table, with some observations on the

mode of preparation, and the advantages of that class of formulæ. He had at a former meeting suggested three questions for consideration. First, Whether it was proper to use concentrated infusions when infusions were ordered in prescriptions? Secondly, In what manner the best concentrated infusions may be prepared? Thirdly, Whether the introduction of that class of preparations into the Pharmacopœia was desirable? At the last meeting he was unavoidably absent, but some concentrated infusions, prepared under his direction, were now on the table; and as no other Member had favoured the Society with a practical paper on the subject, he would, with the permission of the meeting, briefly state the mode of preparation which had been adopted with regard to these specimens. He did not pretend to recommend the process as the best that could be adopted, as it was possible that further experiments might lead to improvements, and he should be glad if those who had been for some time in the habit of making those preparations would give the Society the benefit of their experience. Most of the concentrated infusions, of which specimens were on the table, had been made by percolation, subsequent evaporation at a moderate temperature, the addition of spirit, and filtration after standing for twenty-four hours. The strength was in all cases eight times that of the infusions of the Pharmacopœia. The quantity of spirit was one part to seven in most instances, but in the infusions of senna and orange-peel a larger quantity was added, as the former proportion appeared scarcely sufficient to throw down the mucilaginous deposit. It was probable, however, that by some improved mode of manipulation, one part to seven might be sufficient.

Infusions of senna, gentian, rhubarb, and some others, were better when made with cold water. Others, especially cascarilla, required the boiling temperature. With regard to the preservation of the aroma, this was in part attained in some cases, by setting aside the first portion of the liquor passing through by percolation (equal in quantity to about half the ultimate result). This portion was not subjected to evaporation, but added to the other part of the infusion after the latter had been evaporated to the requisite strength. The evaporation was conducted at a temperature of about 120°, or lower, by the aid of a current of warm air passing through the liquor. The quantity of water was not stated in all the formulæ, but a sufficient quantity was percolated through the ingredients to take up all the appreciable active principles. In the resulting product a difference was observable, occasioned by waste and the mucilaginous deposit, the result being as nearly as possible eight times the strength of the ordinary infusions. With regard to the success of the experiment, he might observe, that most of the infusions appeared to be, when diluted, similar to the infusions of the Pharmacopœia. They differed, however, in some respects, which was easily ascertained, by evaporating a given quantity of each, the amount of solid matter being considerably larger in the Pharmacopœia preparations than in those made by concentration and dilution. This difference was caused by the separation of the deposit, which he believed to be inert, on the addition of the spirit after the evaporation. The presence of spirit having been mentioned as an objection, he might observe, that by diluting the concentrated infusion with boiling water most of the spirit would be evaporated; but this might be nearly as inconvenient as making the fresh infusion. In detailing the result of these experiments he was desirous of directing the attention of the Members to the subject with a view of arriving at the best mode of preparation. But he did not recommend the substitution of concentrated infusions for those ordered in the Pharmacopœia. That question was before the meeting, and also the general merits of that class of preparations. Some of them might be found to be equal, or even superior to the infusions of the Pharmacopœia; others he thought decidedly inferior. The compound decoction of sarsaparilla made by diluting the fluid extract (which was a Pharmacopœia preparation) was generally admitted to be superior to the decoction prepared fresh over the fire. The same might be the case with some

of the infusions, but he was not prepared at that time to give a positive opinion, as the subject was before the meeting for further investigation. The formulæ were as follows:—

INFUSUM RHEI CONCENT. No. 1.

℞ Rhubarb, sliced, ℥vj.
Cold distilled water, 16 pints.
Macerate forty-eight hours, strain and evaporate to ℥xxxv., add
Rectified spirit, ℥v.,
and after twenty-four hours, filter.

INF. GENTIANÆ COMP. CONCENT. No. 1.

℞ Gentian root, sliced, ℥iv.
Dried orange peel, ℥iv.
Lemon peel, ℥viij.
Cold distilled water, 16 pints.
Macerate forty-eight hours, strain and evaporate to ℥xxxv.; add
Rectified spirit, ℥v.,
and after twenty-four hours, filter.

INFUS. SENNÆ COMP. CONC.

℞ Senna leaves, ℥xxx.
Ginger sliced, ℥ij. ℥v. ℈j.
Cold distilled water, 16 pints.
Macerate forty-eight hours, strain and express, evaporate to ℥xxxij.; add
Rectified spirit, ℥viij.,
and after twenty-four hours, filter.

INF. CALUMBÆ CONCENT.

℞ Calumba, sliced, ℥x.
Cold distilled water, 16 pints.
Macerate forty-eight hours, strain and evaporate to ℥xxxv.; add
Rectified spirit, ℥v.,
and after twenty-four hours, filter.

INFUS. RHEI CONCENTRATUM. No. 2.

℞ Rhubarb, in coarse powder, ℥vj.
Boiling distilled water, a sufficient quantity to exhaust the rhubarb by percolation. Evaporate to ℥xxxij.; add
Rectified spirit, ℥viij.,
and after twenty-four hours, filter.

INF. GENTIANÆ COMP. CONC. No. 2.

℞ Gentian root, in coarse powder, ℥iv.
Orange peel, dried and bruised, ℥iv.
Lemon peel, dried and bruised, ℥viij.
Boiling distilled water, sufficient to exhaust the ingredients by percolation, evaporate to ℥xxxij.; add
Rectified spirit, ℥viij.,
and after twenty-four hours, filter.

INF. ROSÆ COMP. CONC.

℞ Dried red rose petals, bruised, ℥vj.
Dilute sulphuric acid, f℥iij.
Sugar, ℥xij.
Boiling distilled water, a sufficient quantity to exhaust the roses by percolation, evaporate (in earthenware) to ℥xxxij.; add
Rectified spirit, ℥viij.,
and after twenty-four hours, filter.

INFUS. CASCARILLÆ CONCENT.

℞ Cascarilla, in coarse powder, ℥xxiv.
Boiling distilled water, sufficient to exhaust it by percolation, evaporate to ℥xxxij.; add
Rectified spirit, ℥viij.,
and after twenty-four hours, filter.

Loss by filtration in each varied from two ounces to three ounces in one pint.

Dr. FARRE said that, as one who had been engaged in preparing the last London Pharmacopœia, he begged to offer an explanation with reference to a statement contained in the preface to that work, which statement was not unfrequently referred to by Pharmaceutists. It was as follows:—"But although we have devoted the utmost care and attention in our power to the methods of obtaining these and all our other preparations, we are aware that skilful Chemists, who understand their profession, may attain the same results by less expensive, or even by more convenient processes. But with respect to what may be accomplished by others, it seems but right to require that the same tests should be applied to their preparations as those by which the purity of our own is ascertained, and that the employment of those medicines should be forbidden which will not stand this ordeal." This statement, he wished to observe, was only meant to apply to chemical preparations which admitted of accurate definition, and not to such preparations as the infusions, for which it would be unjustifiable for a Pharmaceutist to substitute any other process than that given in the Pharmacopœia. He thought it right to make these remarks to guard against the impression that concentrated infusions might be used in dispensing Physicians' prescriptions where infusions were ordered. At the same time, he was glad to find that practical information was being elicited with reference to the best methods of preparing concentrated infusions, and with

reference to the efficacy of these as compared with those made according to the Pharmacopœia.

The Chairman said he presumed that even in the case of chemical preparations the College did not intend that any substance might be used that would stand the tests ordered in the Pharmacopœia, if by the application of other tests it could be shown that the substance was different from that ordered in the Pharmacopœia. A case of this kind had been discussed at their last meeting, when it was shown that what was frequently sold as oxide of zinc, stood the tests described in the Pharmacopœia for the substance, but was nevertheless very different from the oxide of zinc of the Pharmacopœia.

Dr. Farre said, the College were aware that the tests given in the Pharmacopœia were in some cases insufficient and imperfect; but they required that the substances used in dispensing prescriptions should be such as were ordered.

Mr. Redwood said, there were two distinct questions to be considered in reference to the concentrated infusions, and he thought it very desirable to separate them in the discussion of that subject. The one was, Whether a Chemist was authorized in using concentrated infusions in dispensing, when the infusions of the Pharmacopœia were ordered? This question might be considered as disposed of, especially after the statement just made by Dr. Farre. The other question was, Could concentrated infusions be made, the qualities and conveniences attending the use of which would justify their introduction into the Pharmacopœia? This was a question which they were quite justified in taking cognizance of, irrespective of the other. He confessed that his experience was not favourable to the substitution, under any circumstances, of concentrated infusions for those made according to the Pharmacopœia.

The Chairman said, he believed the principal demand for concentrated infusions was among Apothecaries, who found them convenient, and of course were justified in using them in their practice.

Mr. Curtis confirmed the statement made by the Chairman. He wished it to be understood, that although he prepared concentrated infusions, he never used them in dispensing.

Mr. Whipple thought there could be no doubt that Pharmaceutists were not warranted in using concentrated infusions for those ordered in the Pharmacopœia. He thought concentrated infusions very inefficient preparations.

Mr. Greenish had had a good deal of experience in the preparation of infusions in a large dispensing establishment, and he had also for several years directed his attention to the subject of concentrated infusions. His opinion was, that concentrated infusions were not equal to those made according to the Pharmacopœia.

Mr. Daniel Hanbury had been glad to hear that evening so distinct an expression of the unjustifiableness of substituting concentrated infusions, in dispensing, for those ordered in the Pharmacopœia.

REMARKS ON THE PREPARATIONS OF THE PHARMACOPŒIA.

BY MR. GEORGE WHIPPLE, F.C.S.

This communication was partly given by the author extemporaneously, and partly from notes. He said,

The London Pharmacopœia is not a system of chemical philosophy, nor is it a treatise upon pigments, but it is a volume of prescriptions constructed by men eminently qualified to the task—men who are recognized by, and held responsible to, the state. The object is to lessen human woe, and, for the accomplishment of this happy and desired end, the volume is issued to the world that Pharmaceutists may know what the remedies are, and how to compound them. The Pharmacopœia is the laboratory-book, none other should exist: it is written in the imperative mood, hence it orders strict conformity to its formulæ; in a word, the compilers of the Pharmacopœia merit the best thanks of him who claims to be man's best friend.

I think the time has arrived that the Pharmacopœia should be published in the English language, and the trite names formerly used in Pharmacy be restored, the reasons for which are clearly shown in the preface to the Edinburgh Pharmacopœia of 1839, and the Irish Pharmacopœia of 1850, fol. xxi, to which I beg to call the attention of the Committee; moreover, the necessity of adopting the English language is shown by the translation of the London Pharmacopœia of 1824, by the authorized translator, Mr. Richard Phillips, one of England's best practical chemists. The errors pervading the translation are not only numerous, but unpardonable; nor was it until I had published the catalogue of errors, that the corrigenda sheet appeared. In order, therefore, to avoid the danger or risk resulting from the so-called translations, let the Pharmacopœia be published in the English language; if not, inhibit translations.

I think we must also admit the wisdom of the Dublin College in adopting the avoirdupois weight. Although the troy weights are called apothecaries' weights, yet they are seldom found in pharmaceutical laboratories.

The author said he thought an error was sometimes committed in assuming that the substances ordered in the Pharmacopœia were intended to be in a state of chemical purity. To prove that this was not the case, he referred to the Pharmacopœia tests for *Acidum sulphuricum*, *æther*, *calamina præparata*, *potassæ bicarbonas*, *sodæ sulphas*, *sodæ carbonas*, and *spiritus ætheris nitrici*, in reference to all of which a certain amount of impurity was admitted, and he thought it quite sufficient that these substances should stand the Pharmacopœia tests.

With reference to *Liquor ammoniæ acetatis*, he pointed out the difficulty of getting it exactly neutral, and also its liability to undergo decomposition if it be kept for more than a few days.

The following observations were made with reference to the preparations named:—

Aquæ.—I would suggest the necessity of expunging the formulæ directing the use of the essential oils in the distilled waters, and recommend that they be distilled from the fruits, barks, &c. That they be not filtered; but preserved semi-opaque as drawn. When filtered they lose their fragrance and do not keep. It is only when they are super-saturated with the oil (semi-opaque) that they can be kept with impunity. The addition of spirit hastens acidity.

Ceratum Saponis Compositum.—I believe an error pervades the instructions in the London Pharmacopœia for making this cerate, *i. e.*, "Boil until all the moisture be evaporated." There cannot be a doubt that glycerine plays a most important part (as a remedy) in this cerate. When the glycerine is preserved the cerate is smooth and odorous; but when "all the moisture is evaporated," the glycerine is decomposed; the presence of acroleine is powerfully manifested; and the cerate becomes of a dark colour. The odour is like that during the imperfect combustion of fats. It is extremely pungent, exciting tears. I think such a cerate as the latter to be inadmissible.

Decoctum Sarsæ, et Decoctum Sarsæ Compositum.—From the varied products of extract yielded by the varieties of sarsaparilla root, I would recommend that the required densities be given, in order to have those decoctions uniformly of a known strength.

Confectio Sennæ.—This is a very good confection; yet I think an improvement would be effected by retaining twenty fluid ounces instead of "twenty-four fluid ounces." Its present rapid tendency to fermentation would be checked.

Emplastrum Cantharidis.—The formula for this is unexceptionable. Regarding the instructions a slight diversion will augment its potency and render it certain; *i. e.*, erase the present text, and read—To the resin previously melted add the wax, suet, and lard; strain and place them over a gentle fire, add the cantharides, and mix. Remove the fire, and continue to mix them with a spatula until sufficiently solid.

It is known that pure cantharidin is insoluble in hot, and in cold water, but perfectly soluble in oil heated to 250° Fah. I would beg to refer to a paper on

the "Pharmaceutical Treatment of Spanish Flies," by Mr. W. Procter, jun., in the *American Journal of Pharmacy*, Sept. 1852, whence I quote the following:—"When powdered flies are stirred into the ordinary vehicle of resin, wax, and lard, so as to chill it immediately, as was formerly directed; but little of the cantharidin is dissolved by the fatty matter, and, when applied to the skin, the process of vesication is retarded. If, however, the cerate be kept fluid for a length of time, say for half-an-hour, by a water-bath, or other regular heat, no loss of cantharidin occurs by the heat, the active principle is in a great measure dissolved by the fat, and every part is impregnated and active. Another advantage of employing a continued heat in digestion is the removal of the hygrometric water from the flies, which is the source of the mouldiness to which the cerate is prone in certain conditions."

Extractum Lupuli.—I would suggest that the essential oil be first obtained, and finally added to the extract. This is one of those bodies which are never constant in the products. At one time the products are obtained with facility, at others with difficulty, in consequence of the presence of large quantities of vegeto-animal matter. Of such are Pareira, Rheum, Jalapa, &c.

Extractum Colocynthidis Compositum.—The omission of this is to be regretted. I know of no preparation more extolled by medical men, and none more uniform in appearance than the extractum colocynthidis compositum, when rigidly prepared; but, like that masterpiece of useful and important remedies, the syrupus papaveris (alb.), it has been placed in the doubtful gender by the proxies employed for them. We proceed to inquire into the formula. We are directed to employ the purified *extract of aloes*, P. L., a black watery extract, *an excellent remedy of uniform and certain potency!* together with an *alcoholic* (proof spirit) *solution* of the (medicinal properties) of the colocynth. My objection to soft soap in the pill will be presently noticed, nevertheless I venture to suggest to the College the substitution of glycerine, sp. gr. 1.260 for soap. The objection to soap that it is incompatible with calomel will disappear. I think the formula, *Ph. Journ.*, vol. xiv., fol. 321, prolix in obtaining the resin, whilst the mode by P. L. is simple: also, that it is objectionable in employing *aloes*, whilst the P. L. employs the extract of aloes.

I differ with the author of the paper referred to (*Ph. Journ.*, vol. xiv., fol. 321) as to the importance of the soap employed. The Spanish soap is preferable to soft soap. If the soft soap be retained, it will be necessary to have the powders (previously mixed) kept, and made into the mass required by the addition of soap.

Extracta Hyoscyami, Conii, Aconiti, &c.—I would recommend the College to reject the chlorophylle and albumen, by which uniform extracts of constant potency may be obtained; moreover, it would inhibit the introduction of those compounds of chlorophylle, albumen and extract, the green extracts. The P. L. extract is not green on the addition of water, is not tenacious, and frequently exhibits crystals of carbonate of ammonia.

In the *Chemist*, 1844, vol. v., p. 416, I published a paper on extract of henbane, to which I would direct the attention of the College; also appear in the *Chemist*, 1843, vol. iv., pp. 414, 468, 507, papers on extracts, by Mr. G. M. Mowbray.

Extractum Sarsæ Liquidum.—The density should be given for the reasons I have stated.

Extractum Stramonii.—The present process may be improved. The seeds contain a large amount of fatty-oil, which renders it tedious to form an extract. Let the oil be previously expressed, and from the seed cake let the extract be obtained as instructed. The oil itself does *not* differ in its physical and chemical properties from the empyreumatic oil of foxglove. (Morries, *Ed. Med. and Surg. Journ.*, vol. xxxix., p. 379.) *Oil of Foxglove* does *not* contain the sedative principle of foxglove. (Morries, *Ed. Med. and Surg. Journ.*, xxxix., p. 377.)

Infusa.—Remedies which I believe, from the testimony of medical men, to be

amongst the most important preparations of the London Pharmacopœia, and for which there are no proxies.

The aromatic, bitter, and astringent properties of vegetable products are soluble in water, the saline bodies are scarcely, and the resinous not acted upon. None other than P. L. infusions should be employed in prescriptions; their potency is known by him who prescribes them, and he is responsible for their adoption; but to compound prescriptions with proxies for those recognized by P. L. is to me a practice highly censurable. In some of the so-called concentrated infusions and mixtures we find ammonia, potass, soda, and largely alcohol; *i. e.*, Compounds of vegeto-animal matter, resins, &c.; in fact, mixtures of all they should not contain; hence I think their substitution for P. L. infusions not justifiable until their manipulation be known, and merit the approbation of the College of Physicians.—All vessels in which infusions are to be made should be previously heated to 212°.

The hour for adjournment having now arrived, the author's further remarks, on the preparations of the Pharmacopœia, were retained for another occasion.

The Chairman hoped they would have another opportunity of hearing Mr. Whipple, when there would be more time to discuss the subjects brought forward.

Mr. Bell suggested to Mr. Whipple that it would be better in future not to bring forward so many subjects at once. It was quite impossible to discuss them in that way with any advantage.

PHYTOLOGICAL CLUB.

The Second General Annual Meeting of the Phytological Club was held at 17, Bloomsbury Square, on Wednesday, January 10th, 1855,

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Several new Members were elected, and the following Report was then read :—

The Committee of Management of the Phytological Club, in presenting the report for the second year of its existence, have to congratulate the Members on its continued prosperity.

Valuable donations of plants have been received for completing the Central Herbarium of reference and for distribution amongst the Members. These have been reported in the *Pharmaceutical Journal* from time to time. In addition to these a large proportion of last year's collection remain unappropriated.

The Committee have provided a cabinet for storing the Herbarium, so that it may be easily referred to by those who wish to examine the specimens; and they earnestly recommend, as soon as the Central Herbarium shall be completed, that an efficient system be organized for the interchange of specimens between the Members of the Club. This can only be accomplished by the hearty co-operation of all the Members.

There are now ninety-four Members, and although the Committee have had to regret the loss of valuable services, arising from the removal of many active Members who took a lively interest in the foundation of the Club, yet they entertain the confident hope, from the steady progress already made, in the face of many difficulties, that the facilities afforded by the Phytological Club for the study of the science of Botany will attract the rising Members of the Pharmaceutical Society to enrol themselves amongst its Members, and that the vigour thus engrafted will give a fresh impulse to its vitality and prosperity.

The Treasurer's report showed a balance in hand of £7 10*s.* 6*d.*, although many Members had not yet paid up their subscriptions.

The Report having been unanimously adopted, the following Officers were elected for the present year :—

President, Robert Bentley, F.L.S.; Vice-Presidents, Jacob Bell, F.L.S.; Henry Deane, President Pharmaceutical Society; T. N. R. Morson, F.L.S.; T. Redwood, Ph.D.; Peter Squire, M.R.I.; Treasurer, Daniel Hanbury; Curator, J. C. Braith-

waite; Committee, Messrs. Grundy, Greenish, Matthews, Prentis, and Sharpe; Honorary Secretary, Lindsey Blyth.

The meetings of the Club were then appointed to take place on the Second Wednesdays in February, March, May, November, and December in 1855, and the next Annual General Meeting the second Wednesday in January, 1856.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

A Meeting of the North British Branch of the above Association, for the present session, was held in the Rooms, 72, Princes Street, on the evening of Thursday, 11th January,

H. C. BAILDON, ESQ., PRESIDENT, IN THE CHAIR.

The following communication was read,

ON A NEW VARIETY OF COCHINEAL—CAKE COCHINEAL.

(Obtained from Cordova, the Argentine Republic, South America.)

BY JAMES STARK, M.D., F.R.S.E.

My brother-in-law, Mr. Charles Bertram Black, when lately on a visit to some parts of the Argentine Republic, South America, had his attention directed to a dye stuff, or colouring matter, which the natives of Cordova consider of great value, and employ for dyeing cloths all shades of red. Imagining that the substance was unknown here, and that it might be profitably imported for use in the Arts, Mr. Black procured a small quantity of it, and sent it to James Richardson, Esq., of this city. The whole information given regarding it is contained in a letter addressed to me, and dated "Santiago, April, 1854." After stating that the cake sent is a substance used for dyeing cloth all kinds of red, he says, "It is the gum which exudes from a species of cactus like the prickly pear. If Mr. Richardson thinks he can make an advantageous article of commerce of it, I can make all the necessary arrangements for him with a collector. The dye costs from 4*d.* to 9*d.* the ounce, according to the vicinity to the place where it is found."

The dye stuff, as sent home, is a solid flat cake, about a quarter of an inch thick, of a deep red colour, and is marked on its surface as if it had been subjected to pressure between folds of coarse linen. The cake broke with a jagged fracture, and over the surface were seen occasional whitish spots, resembling imbedded fragments of the silver variety of the cochineal insect. A few of the strong thorny prickles of the cactus opuntia, or some similar species, were also seen projecting from the broken edges.

When a portion of the red cake was macerated in water, it swelled but did not dissolve, and then gave out a deep beautiful red colour, absolutely identical with that yielded by cochineal to water. This coloured solution yielded a beautiful carmine when treated with alum; in fact, this dye stuff gave all the reactions which cochineal gives, so that the two solutions, when treated by similar reagents, could not be distinguished the one from the other. When endeavouring, however, to ascertain the relative amount of colouring matter yielded by this dye stuff, and by cochineal, it appeared that it required nearly a sixth more of the red dye cake to produce a colour equal to that yielded by cochineal. In other words, the cake appeared to be a sixth weaker in colouring matter than cochineal.

On examining, by means of the microscope, the solid residuum left undissolved by the water, it was found to consist almost entirely of the bodies of the cochineal insect in various stages of development. Some were nearly as large as a split pea, and were full of ova. In a few the eggs had become developed, and the mother cell, or mother insect, was left as a more or less shrivelled skin, full of perforations, through which the young had probably escaped. In both of these the colour of the body appeared dark, nearly black; there were no silvery markings observable on the rings, like those seen on the silver cochineal. Fewer in number than either of the above, there occurred other cochineal insects identical in every respect with the

common cochineal of commerce. Most of these were quite dark, resembling the black cochineal; others again had the silver markings as occurs in the most esteemed variety of cochineal—the silver cochineal. The bodies of the female coccus, full of ova, were by far the most common of the above; and probably from the whole having been pressed into a cake while still soft, most of the bodies were burst, and the ova, and also very minute but perfect young of the coccus had escaped, and were floating in the water.

The presence of a few of the strong thorny spines of the cactus was evidently attributable to carelessness in gathering; and there were also observed several small fragments of the skin of the leaf of the cactus, evidently scraped off along with the insects.

The red dye cake was, therefore, nothing else than a cake of cochineal insects, collected when the females were full of ova, but also containing others in which the ova had become developed, and escaped from the mother-cell or insect. This latter fact at once accounted for its inferiority to cochineal itself as a colour-producing agent. It is a well-known fact, relative to the whole of the insects which furnish cochineal, lac, and kermes, that the largest quantity of colouring matter is yielded by the mother insect before the eggs are fully developed, and that little colouring matter is yielded by those in which the eggs are fully developed or are hatched. As this cake cochineal contained a considerable proportion of females in which the ova were arrived at their full development, and several were even hatched, this satisfactorily accounted for the smaller proportion of colouring matter which the cake yielded.

We are informed that this cake cochineal—for so, I think, it may be safely termed, cost in Cordova from 4*d.* to 9*d.* the ounce—that is, from 5*s.* 4*d.* to 12*s.* the pound. As the best cochineal can be bought here for about 4*s.* the pound, this fact at once settles the question as to the profitable introduction of this red cake to this country as an article of commerce.

After the above details it is unnecessary to say that this substance is not a gum, nor an exudation from a prickly pear (or cactus) as Mr. Black had been informed it was by the native collectors. Had it been so, it would probably have been a new dye stuff, and might have proved of much value to commerce. As it is, I think this Society will agree with me, that Mr. Black deserves the thanks of the mercantile public for bringing under their notice a dye stuff which might have been both new and valuable.

21, *Rutland Street*, 15*th Nov.*, 1854.

LIVERPOOL CHEMISTS' ASSOCIATION.

The usual fortnightly Meeting of this Society was held at the Royal Institution on Friday evening, Dec. 8, Mr. E. Evans, President, in the Chair.

Mr. Geo. Hamilton, F.C.S., delivered his second lecture on "Iron and its Pharmaceutical Preparations." The portion of the subject included in this lecture, related to the various salts of iron, which were noticed in succession, the lecturer remarking particularly upon such of them as were used in medicine, and explaining their mode of preparation, tests, &c. The lecturer illustrated his remarks by a large collection of specimens and a variety of experiments; and after a few remarks by Mr. Abraham and Dr. Edwards, the thanks of the Meeting were unanimously awarded to him for his able and interesting lecture.

Mr. W. H. Fisher gave a description of Bainbridge's patent stove and furnace, illustrating his remarks by a diagram. This stove is of a very peculiar construction, and from Mr. Fisher's description of it, possesses, in addition to its other valuable properties, that of being a perfect consumer of its smoke. Several questions were asked respecting its construction and principle, which were answered by Mr. Fisher.

The Secretary acknowledged the receipt from the Literary and Philosophical Society of the last volume of their *Transactions*.

A Meeting of this Association took place in the Royal Institution on December 22nd, Mr. Abraham, Vice-President, in the chair. A paper on "Allotropy," by Mr. H. S. Evans, was read in his absence by the Secretary, Mr. Walker.

Many substances, simple and compound, are susceptible of certain changes in

their physical properties, without a corresponding change taking place in their weight or chemical composition. Though these changes often escape the notice of the casual observer, yet to the Chemist they furnish a key by which a door to future discovery may be opened. The most striking instance of the allotropic change to which substances are subject is sulphur. This elementary body undergoes various changes in its crystalline as well as amorphous condition, the most striking and important of which are, that when heated considerably above its melting point, to about 130° F., sulphur becomes quite viscid, and when poured into water solidifies into a soft vitreous mass, but in the course of a few days assumes its former condition, at ordinary temperatures. When sulphur thus melted is fresh cooled, it has a density of 1.960; when quite solid, but still of a brown colour, 1.980; and when it has entirely resumed its former appearance, and yellow colour, its density is 2.041.

The melting point of sulphur is 232° F.; it is then thin and fluid as water, but between 430° and 480°, it is so tenacious that the vessel containing it may be inverted without the loss of its contents. At higher temperatures it becomes again fluid, and if in this state it be suddenly cooled by plunging into cold water, it becomes a ductile mass, and may readily be moulded to any desired form. Sulphur crystallizes in two forms, namely, an octohedron with rhombic base, the figure of native sulphur; and a lengthened prism, when melted sulphur, after being partially cooled, and the crust at the surface broken, a portion of the fluid sulphur is poured out.

Phosphorus is found in several amorphous conditions, as well as the crystalline. There are three modifications of amorphous phosphorus, and when slowly cooled crystals of regular dodecahedrons are formed. Carbon in like manner presents itself in different conditions, in the crystalline as the diamond, and in the amorphous as charcoal. Iron is familiar to us in two forms; as cast iron it is brittle, and when broken has a crystalline fracture, while as wrought iron it is tough and fibrous. Copper, platinum, quartz, arsenious acid, the oxides of mercury, cane sugar, the sesquioxide of iron, alumina, &c., are also allotropic substances, and the different forms in which they are met with, were noticed and referred to.

In all the instances which have been adduced a change may have been effected through a different arrangement of the molecules. No ponderable substance has been lost, but in each case it is demonstrable that an imponderable agent, heat, has been lost; and as this heat was not before appreciable to the senses, it must have existed as latent heat; and that the cause of the various changes we have been considering is due to the presence or absence of this latent heat is evident, if we bear in mind that heat is the force of repulsion, while cohesion is the opposite force. Take sesquioxide of iron, for example, and suppose that, when recently prepared and in the soluble state, it contains a greater amount of combined heat than in the insoluble state. The repulsive force overcoming the cohesive force repels the molecules, and the interstices becoming greater between them a larger surface is exposed to the solvent action of the menstrua employed, whereas, when the latent heat is dissipated by the application of an intense heat, a reaction takes place, and the cohesive force, having no antagonist to contend with, the molecules are forcibly attracted and resist the action of solvents. By assuming that heat is an essential ingredient in the composition of bodies, and forms a true constituent, the addition or abstraction of which is capable of producing changes and modifying the properties of bodies, the solution of the phenomena related is easy, and we may thus conclude that the allotropic changes in bodies depend upon the proportion of latent or combined heat, and that this is a veritable constituent possessing a similar modifying influence over the body to any of its other produceable constituents.

After some little discussion on Mr. Evans's paper—

Dr. Edwards brought forward the subject of "Concentrated Infusions and Decoctions," with reference to the question whether or not it was desirable to introduce formulæ for them into the Pharmacopœia. He said he brought this subject forward because it had already been introduced at a meeting of the Pharmaceutical Society in London, and the discussion adjourned, and he thought it very desirable that they should have as much information as possible. Moreover, he hoped all the preparations of the Pharmacopœia, and other preparations which any Member thought ought to be introduced, would in turn come under discussion. Concentrated infusions were at the present time much in use, especially amongst medical men who dispensed their own medicines, and from the opinions he had heard them ex-

press upon the subject, he believed their experience would go far to justify their use. At present there was no recognized formulæ by which any of them were prepared; they all varied in strength; indeed most makers allowed that their preparations were when diluted really stronger than those of the Pharmacopœia. They all contained spirit varying in quantity from one-sixth to one-sixteenth of their volume. Infusion of rhubarb might be taken as an example of the many formulæ used; some makers used hot water, others cold; some filtered when cold, and others while hot, variations which would make a material difference in the product. It was not, he thought, as some appeared to think, that concentrated infusions were absolutely necessary to the Dispensing Chemist. The plan of keeping infusions proposed by Mr. Redwood, he considered admirably adapted for supplying infusions made according to the Pharmacopœia at a moment's notice. This plan consisted in making the infusions in the ordinary way, and then putting them into bottles provided with stoppers or good corks, and which are filled to the brim. If the infusion was not hot when put into the bottles it must be made so by plunging the bottles into boiling water for a few minutes, inserting the stoppers, and placing aside to cool. As the infusion cools it will contract, and leave a vacuum in the upper part of the bottle. Infusions prepared in this manner will keep many months without undergoing any change. Dr. Edwards concluded by reminding the meeting, that the question was not so much whether concentrated infusions ought to be used, as whether they ought to be inserted in a future edition of the Pharmacopœia.

Mr. Walker said the specific gravity of the same infusion by different makers varied considerably, no doubt from their containing a variable amount of spirit. All Chemists, he was sure, would keep concentrated infusions to use in cases of emergency, even though as a rule they used freshly prepared ones. He would propose that all the present infusions should be excluded from the Pharmacopœia, and be replaced by concentrated ones.

Mr. Lawson thought the only objection was that they contained spirit.

Mr. Abraham considered that the concentrated infusions could never accurately represent the ordinary ones, because they must contain a portion of spirit, and if they were introduced into the Pharmacopœia, the question must often arise which of the two formulæ did the prescriber wish to be followed. Except in cases of emergency he always used freshly made infusions, but cases did sometimes occur when he considered he should neglect his duty as a Dispenser were he to delay a prescription while a fresh infusion was being made. If they were introduced, he thought it very advisable that a more distinctive name than "Concentrated Infusion" should be given to them. He would suggest that they be called "Liquors," and then when the prescriber ordered "Liquor Calumbæ," for instance, all doubt as to the preparation meant would be removed from the Dispenser's mind.

Mr. Mercer quite agreed with the Chairman as to the superiority of the term "Liquor" over "Concentrated Infusions;" but thought the question had been too much narrowed by taking for granted that a concentrated preparation could not be made without the addition of spirit. Infusion of senna had been prepared without spirit, which would keep for a length of time, and further investigation might result in the preparation of other infusions by some similar method. He also called attention to a very serious objection against preparations containing weak spirit. It was well known to Pharmaceutists that such compounds, containing spirit in any smaller proportion than proof tinctures, were very liable to undergo acetous fermentation, and consequently would, at different times, vary very much in their composition. Almost all the concentrated infusions he had tried gave an acid reaction. This, of course, might arise from the nature of the substance infused, but in the majority of instances he believed it to arise from acetous fermentation having commenced.

After some further discussion, in which several Members present joined, the subject was adjourned to a future meeting of the Society. A large number of specimens of concentrated infusions, prepared by some of the first makers in the country, were on the table, and also several infusions prepared by Mr. Redwood, according to his plan referred to above.

The Secretary announced that on Friday evening, the 5th January, Mr. T. C. Archer would deliver the first of two lectures on Economic Zoology, with especial reference to the animal preparations used in Pharmacy.

The usual fortnightly meeting of this Society was held in the Royal Institution, on Friday evening, Jan. 5, Mr. ABRAHAM in the chair, when T. C. ARCHER, Esq., delivered the first of two lectures

ON ECONOMIC ZOOLOGY.

After a brief introduction, in which he pointed out some of the objects to be attained by Pharmaceutists in the study of natural history, the lecturer explained the classification which he intended to adopt in the treatment of his subject, viz., that of Cuvier, and then proceeded to the consideration of the individual orders, comprised under its several divisions, with a view to show in what way and to what extent they each contributed to the wants of man, and consequently to the promotion of commerce.

The groups of Bimana and Quadrumana, which stood at the head of the class Mammalia, afforded no materials for commerce, if we excepted the small trade carried on in human teeth and the very large transactions which took place with the dealers in human hair. These dealers were called Farmers, and the hair was collected chiefly in the agricultural districts of Germany, France, and Ireland. It was collected periodically, and the price to the poor damsels who thus from necessity parted with their dearest ornament was 5*s*. per pound. This hair, when worked up by the hair-dresser, was often increased in value to from 20*s*. to 80*s*. per pound, and even more. The finest black hair procurable was from Brittany, the finest brown from other parts of France, and the light colours from Germany. That obtained from Ireland was of a mixed and inferior character. The farmers knew pretty well what length of time a lady's hair took to grow, and they came round regularly and polled the entire district. In Germany, extraordinary pains were taken to improve the quality of the hair, a peculiar head-dress being worn for that purpose.

The order of flesh-eaters, or Carnivora, comprised several important genera, as the cat genus, containing the lion, the tiger, the panther, &c.; the dog genus, containing the wolf, fox, hyæna, &c.; the bear genus; the weasels and polecats; the badger, otter, and seal. In an economic sense these animals yielded several useful materials, chiefly consisting of their skins. Thus the tiger, the leopard, the panther, the ounce, the jaguar, the fox, the marten, the sable, the ermine, the minx, the seal, and others, all yielded skins, valuable either for their handsome markings, as the tiger and others of the cat genus, or for the beautifully soft hair called fur, which was found upon the weasel tribe. These last-mentioned animals were chiefly found in the temperate and antarctic zones, and some of them, as the ermine, changed their fur with the season ; the ermine especially was brown in summer and pure white in winter, with the exception of its tail—exhibiting a striking instance of that beautiful harmony of colour which was believed to prevail throughout all nature. Of all the animals of this order, the seal was of greatest real utility to man; its skin furnished a useful material for clothing, which was much valued by the lower orders in cold climates; and from its blubber was obtained an abundance of valuable oil. Several species of seal were taken for their oil, and in Newfoundland and Labrador the number annually killed for this purpose was said to be 1,500,000. Only one species was taken for its skin ; it was the fur seal, *Arctocephalus Falklandicus*.

In treating of the whales, the lecturer pointed out the importance of the blubber in affording buoyancy and protection from cold and pressure, and the nature and uses of spermaceti, ambergris, and other substances yielded by this tribe. The products of the cetacea which were imported into this kingdom would give some idea of the importance of whales to man. Of whale oil of various kinds, and blubber, the average annual import was 25,000 tons of 252 gallons, worth about £1,000,000 sterling; of whalebone, about 390 tons, worth about £5,000; of ambergris, about 100lb., worth about £1,000.

The economic value of the horse was perhaps greater than that of any other animal. Its products were horse-hair, hides, and grease. These were usually imported from South America, chiefly from Buenos Ayres. Of horse-hair we received about 400 tons, of the value of £40,000. Its uses were various, but the principal were stuffing chair bottoms, couches, &c., for which it was admirably adapted. Of horse-grease, also from South America, we received about 120 tons; and of horse hides, from 12,000 to 14,000. The two latter were principally obtained from the wild horses, which were slaughtered in great numbers. The grease was remarkable for

its penetrating property, which rendered ordinary casks of no use in conveying it. The method generally employed was to give the cask a thin coating of glue inside; and doubtless the metallic casks, which were now coming into use, would be found of great service in this trade. Another quality of this grease was, the great facility with which it could be separated into its component parts.

The elephant yielded us ivory, the history of which substance, and its manifold applications, would alone furnish ample materials for a lecture. Ivory came to us from India and Africa. In 1849, the imports of this material were 229 tons, which at 5*s.* per lb. would give a value of £125,740. Many tusks were worth more than £20 each. In speaking of swine, it was observed that the value of these animals as food was greater than appeared at first sight; it was not simply the quantity yielded, or the ease with which this article of ordinary consumption was produced; but it was the only animal food which could be advantageously preserved for a long time, in a dry state. This was its chief value. The other products were lard, of which we imported in 1851, from America, 11,481 tons, of the value of £332,538. The import of bristles from Russia averaged 870 tons, of the value of £110,000.

Hyraceum, which has been proposed as a substitute for castor, was stated to be yielded by the hyrax capensis, or Cape badger, an animal about the size of a large rabbit. A great deal of discussion has taken place as to what hyraceum really was, but the weight of the evidence was in favour of its being the hardened urine of the animal. Its value is pretty well determined now, by its almost ceasing to be an article of commerce, for instead of its superseding castor as an antispasmodic medicine, the bulk imported has been used for manure.

Of oxen, the estimated number in 1851 was 4,200,000, of the value of £37,800,000; about one-fourth of this enormous number, it was calculated, were annually slaughtered.

Inspissated gall was formerly, though now very rarely used in medicine as a tonic. Gall contains a small quantity of alkali, potash most probably, which renders it an extremely useful article to the artist to mix with his colours; indeed, without it, Mr. Archer stated he should hardly be able to prepare his diagrams, for where there is the least greasy spot, the ink refuses to run, but on the addition of a little gall it flows over the greasiest part of the paper as smoothly as over any other.

Many interesting details respecting sheep, and the articles derived from them, were referred to, and the birds and reptiles were also noticed in the same instructive manner.

The order of fishes was the last to which he drew attention, and of these the most remarkable brought under notice was the sturgeon, from which isinglass is obtained. Isinglass was stated to be the air-bladder of the fish, dried, and packed in different shapes, known by the names of leaf, purse, staple, pipe, &c. To bring it into the state in which it is sold in druggists' shops, various preparations, and powerful and complicated machinery, had to be employed. In London there were very large manufactories of this kind. The best kind came from Russia, under the name of the Caspian Leaf, but the trade was now extending to the Brazils, and also to the East Indies. The East Indian sort was not made from the air-bladder of the sturgeon, but from that of the *Polynemus plebeius*. The word *isinglass* came from the German *hausen blase*, signifying the swimming-bladder. From the roe of the fish there was another article occasionally imported, though chiefly as presents from the Greeks and Italians to their friends in this country. It was called *caviare*, and was brought in tins or pots of the size and shape of a Stilton cheese. Its colour was green, and in appearance and smell it was very much like rancid grease. It was considered by those who used it a very great luxury; but to those who had not acquired a taste for it abroad, it was extremely offensive.

The codfish also yielded a species of isinglass, but it was known as cod-sounds, and used for food, or as bait for fishing. Cod-liver oil was also a valuable product from this. Its qualities were said to depend, and no doubt correctly, on the fact that it contained a portion of iodine. The mode of making the oil was exactly the same as in the case of common cod oil. The fishermen, in opening the fish, cut out the livers, which were collected into large tanks, made of hurdles built on the shore, where they were thoroughly exposed to the heat of the sun, which was very intense in Newfoundland during the short summer enjoyed there. Decomposition soon commenced, breaking up the tissues of the liver containing the oil, and the oil then began to flow out. The first running was of a light yellow colour, and this was the kind used for medicine; the residue was of a coarser quality, and was used for

ordinary purposes. Some of it was as dark in colour as coffee, and was mixed with pieces of the decomposed liver.

Mr. Archer illustrated his lecture with a large number of diagrams and specimens; among the latter was a very valuable collection of specimens of the various kinds of isinglass known in commerce, belonging to the Chemists' Association.

The Chairman moved a vote of thanks to Mr. Archer for his very valuable lecture, and was sure he was only expressing the feeling of the meeting when he said that all present would look forward with interest to the one which had yet to be delivered.

BIRMINGHAM.

LIBRARY OF THE PHARMACEUTICAL INSTITUTION.

The Committee of the Birmingham Pharmaceutical Institution are desirous of calling the attention of the Chemists' Assistants and Apprentices of their neighbourhood to the following resolution, viz. :—

"That the subscription to the Library shall in future be not less than 5*s*. per annum for Principals, and 2*s*. 6*d*. per annum for Assistants and Apprentices."

The Library is now kept at Messrs. White and Pike's, Booksellers, Bull Street, where subscribers may obtain books between the hours of 9 A.M. and 8 P.M., daily.

A printed catalogue can be obtained on application to Mr. Geo. Cattell, 17, Bull Street.

ORIGINAL AND EXTRACTED ARTICLES.

ON SOME RARE KINDS OF CARDAMOM.

BY DANIEL HANBURY.

"Nulla res est fortasse in re Pharmaceuticâ magis litigiata quàm Cardamomi notitia."—Geoffroy, *Tractatus de Materiâ Medicâ*, t. ii., p. 364.

The natural history of the various fruits of the order *Zingiberaceæ*, grouped together under the name of *Cardamom*, has always proved a subject of difficulty to pharmacologists. Probably one cause of this is the imperfect manner in which botanical specimens of these plants have been preserved (occasioned principally by the succulent nature of their flowers and fruits), and a second may be due to the fact that comparatively but few botanists have been able to labour for a sufficient length of time in the hot and humid regions in which *Amomum* and allied genera chiefly abound.

Among the pharmacologists to whom we are indebted for researches on this difficult subject is the late illustrious Dr. Pereira, who, with the energy which so signally marked his character, was enabled to throw much light on the pharmacological history of various species of *Amomum* occurring on the West Coast of Africa, and affording the different varieties of *Grains of Paradise* or *Melliguetta Pepper*.

Important botanical observations have more recently been made by Dr. Joseph Dalton Hooker,* who has had the advantage of an interesting series of specimens of *Amomum* collected with much labour by Dr. W. F. Daniell on various parts of the West Coast of Africa.

Professor Guibourt, of Paris, has contributed many accurate observations on the same subject, and especially some notices and figures of certain species of Cardamom, which, although rarely met with in Europe, are important articles of trade in the Eastern Archipelago and in China.

It is to these latter species, namely, the Cardamoms of Siam, Cochin China, Tonquin and China, that the present paper refers; and I must preface it by saying that my object is to place the information we possess in a collected form and to point out the desirableness of further researches, rather than to communicate much that is new. It is my hope that Europeans residing in the countries in question, who take an interest in natural history, may be stimulated to some

* Hooker's *Journ. of Botany*, vol. iv., p. 129; vol. vi., p. 289.

exertion to discover the botanical origin, and obtain further accounts regarding the culture, the collection, and the uses of these productions, which, apart from their interest to the pharmacologist, are derived from plants, many of which, remarkable for a splendid inflorescence, would become valuable additions to the horticultural collections of this country.

LARGE ROUND CHINA CARDAMOM. (FIG. 1.)

Large round China Cardamom.—Pereira, *Elements of Materia Medica*, part ii. (1840), p. 699, fig. 133.

Large round China Cardamom.—Pereira, *Elem. of Mat. Med.*, ed. 2, vol. ii. (1842), p. 1035, fig. 203.

Autre Cardamome rond de la Chine.—Guibourt, *Histoire des Drogues*, éd. 4, tome ii. (1849), p. 215, fig. 115.

Round Cardamom.—Pereira, *Elem. of Mat. Med.*, ed. 3, vol. ii. (1850), p. 1139, fig. 255, 256.

Groszes rundes Chinesische Kardamom.—Martiny, *Encyklopädie der Medicinisch-pharmaceutischen Naturalien und Rohwaarenkunde*, Bd. ii. (1854), p. 776.

草蔻 *Tsaou-kow.*

Fine specimens of this fruit were procured by my brother, Mr. Thomas Hanbury, at Singapore, in the drug shops of which place, he tells me, it appears by no means plentiful. Deprived of the husk (fig. 2), I have also received it from Canton and Shanghae, from the latter place under the above-mentioned

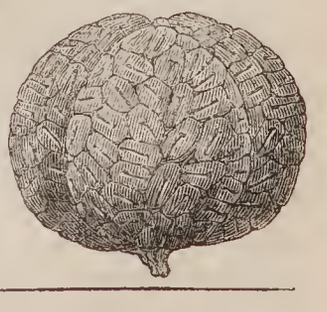
FIG. 1.

Large round China Cardamom (fruits and seeds).

character, *Tsaou-kow*, the same name, I presume, as that given by Loureiro, as applied to his *Amomum globosum*.* In the Sloanian collection in the British Museum, there is a small specimen of this fruit.

The *Large Round China Cardamom* varies considerably in size, my specimens being from $1\frac{2}{10}$ inches to $\frac{6}{10}$ of an inch in length. The capsules are somewhat oval or globular, pointed at either extremity, obscurely three-sided (except at the base, where the triangular character is strongly marked); they are sometimes attached to a long pedicel. The pericarp closely invests the mass of seeds; it is brown, thin, and strongly marked externally with interrupted longitudinal ridges; it is hardly aromatic. The seeds are coherent into a three-lobed mass (fig. 2); they are generally light greyish-brown, angular, with a deep furrow on one side; they have a slight aromatic odour and taste, the latter suggestive of Thyme (*Thymus vulgaris*), though much weaker.

FIG. 2.



This Cardamom is a native of the South of China, and of Cochin China, whence it is exported. It appears to be much employed in Chinese medicine as a stomachic.

* *Flora Cochinchinensis.* Berolini, 1793, t. i., p. 6.

SMALL ROUND CHINA CARDAMOM. (FIG. 3.)

Cardamome rond de la Chine.—Guibourt, *Hist. des Drogues*, éd. 4, tome ii. (1849), p. 215, fig. 113, 114 (excluding other synonyms).

Until recently I considered this Cardamom as simply a variety of the preceding, but the decided opinion of its distinctness expressed to me by Professor Guibourt, induces me to place it under a separate head.

Dr. Pereira seems to have confounded it with his "*Round Cardamom*, fig. 255," which is a representation of M. Guibourt's "*Autre Cardamome rond de la Chine*," as a comparison of the woodcuts will plainly show.

Specimens of the *Small round China Cardamom* are preserved in the Musée d'Histoire Naturelle at Paris. M. Guibourt likewise possesses specimens, and has kindly presented me with one. I have never received this Cardamom direct from China.

The following description of the *Small round China Cardamom* is taken chiefly from M. Guibourt's work:—

FIG. 3.

Small round China Cardamom

Capsules pedicelled, nearly spherical, from seven to eight lines in diameter, slightly striated longitudinally, and much wrinkled in all directions by drying; it is probable, however, that the fruit was smooth when recent. The capsule is thin, light, easily torn, yellowish externally, white within. The seeds form a globular coherent mass. They are rather large and few in number, somewhat wedge-shaped, of an ashy-grey, a little granular on the surface, and present on the outer face a bifurcate furrow, shaped like a Y. They possess a strongly aromatic odour and taste.

To this description I may add that, compared with the *Large round China Cardamom*, the capsules in question are more wrinkled in a network manner, more fragile and thin, and (from immaturity?) much less adherent to the mass of seeds; they are more globose, not triangular at the base, but flat, or even depressed like an apple. Their colour, in all the specimens I have seen, is a brownish-yellow. I cannot confirm M. Guibourt's remark as to the highly aromatic properties of the seeds.

This cardamom, which appears to bear the same Chinese name as the foregoing, is attributed by M. Guibourt to the *Amomum globosum* of Loureiro.

HAIRY CHINA CARDAMOM. (FIGS. 4, 5.)

Small round China Cardamom.—Pereira, *Elem. of Mat. Med.*, part ii. (1840), p. 699.

Small round China Cardamom.—Pereira, *Elem. of Mat. Med.*, ed. 2, vol. ii. (1842), p. 1035, fig. 204.

Cardamome poilu de la Chine.—Guibourt, *Hist. des Drogues*, éd. 4, tome ii. (1849), p. 214, fig. 112.

Hairy China Cardamom. Hairy round China Cardamom.—Pereira, *Elem. of Mat. Med.*, ed. 3, vol. ii. (1850), p. 1140, fig. 257, 258.

Cardamoma Chinensia muricata; Weichstachelige Kardamomen.—Martiny, *Encyklopädie der Med. Pharm. Naturalien und Rohwaarenkunde*, Bd. ii. (1854), p. 776.

陽春砂 *Yang-chun-sha.*

Professor Guibourt has suggested that this fruit may be the produce of the *Amomum villosum* of Loureiro, an opinion in which the late Dr. Pereira concurred. Loureiro's description is, however, quite insufficient for determining this from the fruit alone; and as there is, unfortunately, no specimen of *Amomum villosum* either in the British Museum or in the Musée d'Histoire Naturelle of Paris, in each of which institutions some portion of his herbarium yet exists, and

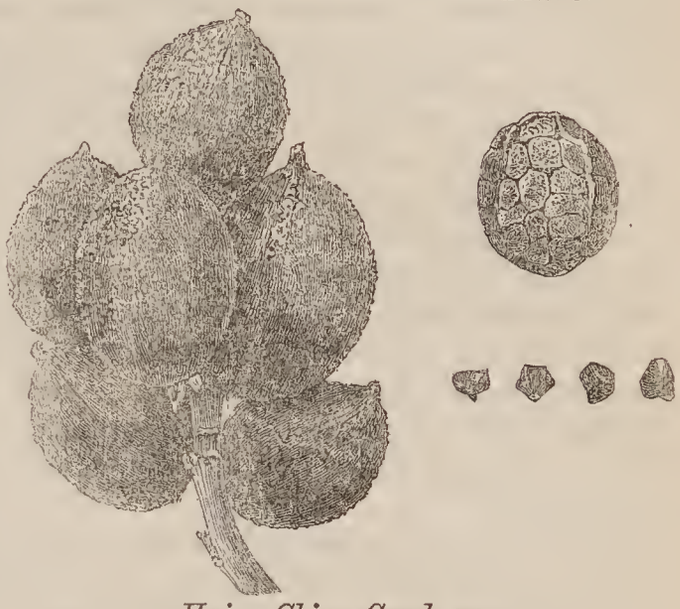
as the species has been recognized by no other author, it seems at present hardly possible to decide this point.* According to Loureiro, his *A. villosum* is called in Chinese *Sŏ Xā m'i* † 縮砂密 a name under which I have never received the *Hairy China Cardamom*. Specimens of this cardamom are preserved in the Sloanian collection in the British Museum.

From my brother, Mr. Thomas Hanbury, I have received some very fine samples purchased by him at Singapore. I am also indebted to Mr. Lockhart of Shanghae, and to Mr. Lobscheid of Hong Kong, for specimens procured in the drug shops of China.

The *Hairy China Cardamom* is sometimes sold attached to the stalk, sometimes removed from it.

The scape, which when perfect, is about three inches long and reclinate, bears as many as eight or ten capsules upon its superior extremity. The capsules are from six to ten lines in length. In the dried state they are oval, occasionally nearly spherical, more or less three-sided, bluntly pointed, with a scar at the summit, rounded at the base, and attached by a pedicel one to two lines long. The pericarp is externally dark brown, marked with obscure longitudinal *striæ* and covered with asperities, which, after soaking in water, proved to be short, thick, fleshy, closely-crowded spines. It has, when bruised, an aromatic and tar-like odour; the seeds have a similar tar-like odour, and taste not unmixed with the aromatic warmth of the Malabar Cardamom; they are angular, and upon the removal of the pericarp remain united in a three-lobed mass.

Fig. 4. Fig. 5.



Hairy China Cardamom.
Fig. 4—Fruit. Fig. 5—Seeds.

The scape is densely villous, especially at its upper extremity, but I can detect no hairs upon the pericarp. If Loureiro's *Amomum villosum* be identical with this species, its specific name was probably taken from the short spine-like processes with which the pericarp is beset, and which pericarp Loureiro described as "*exterius obsessum villis multis, crassis*,"—a character, however, more applicable to another species than to this.

Mr. Lobscheid informs me that this Cardamom is said to grow in the province of Kwang-tung, and in the Yang-yun district of Southern China. It appears to be frequently used in medicine by the Chinese.

Loureiro states of his *Amomum villosum*, whose Cochinchinese name is *Sa nhon*, that it occurs without cultivation in Qúi-nhon and Phu-yen, provinces of Cochin China, and that its seeds are exported to China, where they are largely employed in medicine.

(*To be continued.*)

* M. Laségue has stated in his *Musée Botanique de M. B. Delessert* (p. 348), that the Academy of Lisbon possesses the greater part of Loureiro's herbarium. I regret to find this does not appear to be the case. M. Francisco Antonio Pereira Da Costa of Lisbon has informed me, that, so far as he can ascertain, the herbarium in question never existed at the Academy; it was supposed to have formerly belonged to the Museu da Ajuda; but upon the removal of that establishment to the Academy, no trace of it could be discovered.

† Now usually spelt *Sŭh-sha-meĭh*. The Chinese characters are taken from the *Pun-tsaou*, where there is a coarse woodcut of the plant.

ON THE AMOMA OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.R.G.S.,
Honorary Member of the Pharmaceutical Society.

(*Continued from page* 312.)

In the *Remedia Guineensia* the aboriginal uses and synonymes of the true Mallaguetta pepper, are correctly denoted, though strange to relate, the flowers of the plant to which the descriptive outline pertains, are stated to be white, and to resemble those of the *Amomum exscapum*, Sims. Nothing, however, could be more erroneous than this representation, as they widely differ in many respects. Owing, therefore, to this oversight, the *Icones plantarum Medicinalium* of Nees ab Esenbeck, which contains a faithful illustration of the leaves and capsule of the true, has been conjoined with a *fac-simile* of the flowers of *A. Exscapum*, Sims, as figured in the *Annals of Botany*. A somewhat detailed summary of the genus has been drawn out by Sir J. E. Smith, in Rees' *Cyclopædia*, in which numerous species are mentioned, but he unfortunately labored under manifest disadvantages, from a deficiency and inappropriateness of materials. The majority of his descriptions have been taken either from imperfect specimens of plants, or single fruits, consequently so many discrepancies occur, in the distinction of species, that no certain reliance can be placed on them. The species delineated as that, producing the grains of Paradise, is the *A. Exscapum*, Sims, and therefore cannot be the Mallaguetta pepper, while the general incongruity of terms has been such, that his *A. Granum Paradisi* (as Dr. Hooker justly observes) appears under no less than three names.

Roscoe, in his admirable work on Monandrian plants, has afforded the best account of this production, and also acknowledged to be the most accurate. Not aware of the anomalous characters existing in Afzelius' outline of the *A. Granum Paradisi*, or that the plant then under his consideration was only a variety of the former, he naturally determined it to be a new species, on which he bestowed the term of *Amomum Melegueta*. The reasons he brings forward in support of his views are as follow :—"Afzelius, we are informed, considered himself as having made a great discovery in determining the *Grana Paradisi* to be the true *Melegueta pepper*, but after comparing our very perfect specimens of both flowers and fruit, with the figures and descriptions of preceding authors, and particularly with those of *Gærtner* and the *Cyclopædia*, we find diversities between our plants and the *Grana Paradisi*, which it appears to us impossible to reconcile."* Pereira, in his *Elements of Materia Medica*, has correctly assigned the grains to their proper source, viz., to the plants of the two preceding authors, but unfortunately deceived by an indefinite appliance of similar titles, has confounded the capsules of Smith's *A. Granum Paradisi* (A. Exscapum) with those of Afzelius and Roscoe. They, however, belong to quite a distinct species, and are not the ordinary grains of Paradise. In Curtis's *Botanical Magazine* for 1851,† a good descriptive detail of the *A. Exscapum*, Sims, will be found under Smith's appellation of *A. Granum Paradisi*. The author has, however, in following Pereira, committed precisely the same error, in asserting that the fruit agrees with that of Afzelius, in the *Remedia Guineensia*, which is obviously the reverse, if placed in comparison with the excellent and (so far as I know) the only illustration of the leaves and pod, as depicted in Nees' *Icones*, &c. The plant has likewise been improperly termed Grains of Paradise Amomum, or Mellegetta pepper, which it certainly does not produce, nor would the seeds be recognized as such by any intelligent native of tropical Africa. These misconceptions owe their origin in a great measure to the name conferred on two dissimilar species being alike, one of which only affords the true Mallaguetta, viz., that of Afzelius. It has been assumed on somewhat

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* *No.* 81, *Tab.* 4603. † *Roscoe, Monandrian Plants, &c.*

equivocal data, that botanists have been guided in the precedency of their nomenclature by certain valid laws, or established usages of equal force, from which no deviation can be permitted; but if priority of description be esteemed as one of the fundamental principles on which this precedency is based, there is ample cause for regret, that these rules should not have been more strictly adhered to. A constant variation or succession of synonymes attached to many vegetable products, evince decisive evidence, either that such laws are not imperatively upheld, or that a remarkable amount of inconsistency prevails amongst botanical writers. The retention of a specific designation derived from some peculiar characteristic of the fruit, by a plant that *does not* yield it, is an anomaly which ought not to be tolerated by scientific authorities, for the conservation of such irregular terms, must conduce to the perpetuation of error, and ultimately augment to a much larger extent the distrust and confusion already existing. The sooner, therefore, this absurd system of nomenclature is abolished, the less difficulty there will be in arriving at sounder conclusions, concerning the source of various medicinal imports.

Recent researches have established the fact, that though the Mallaguetta pepper exclusively results from a solitary species of Amomum, there are nevertheless several varieties of the same plant, indicated by distinctions so marked, as to induce the belief they rather pertained to other kinds of Amoma. In a pharmaceutical point of view, these variations are of sufficient importance to demand attention, and to render the subject more intelligible, it will be convenient to arrange their descriptive outlines under the specific name of *Mallaguetta vera*, or true grains of Paradise, while the more comprehensive history of the other African Amoma, may be referred to that of *Mallaguetta dubia*, or false grains of Paradise. Excellent delineations of several of the species, combining in their botanical details the essential requisites of accuracy and fidelity, have appeared in a paper recently published by Dr. J. Hooker, on a collection of Amoma brought from Sierra Leone by myself in 1854. From his account, the botany of the different plants to which they apply will be for the most part taken, for notwithstanding the elaborate descriptions of many illustrious authorities, none have previously enjoyed the advantage of recording from perfect specimens of the leaves, fruit, and flowers, or entire plants in their natural growth and condition, their observations with an equal degree of certainty and minuteness.

Mallaguetta Vera.

Modifications in the development and conformation of the Amoma, as I have already stated, chiefly depend on local influences. The species indigenous to hilly or alpine districts, as a general rule, become more restricted in size in proportion to their local elevation, for the same plant when seen in lowland or marshy regions, attains that exuberance of growth, as to appear of almost gigantic dimensions, when contrasted with the dwarfish product of mountainous countries. The Mallaguetta found in Soudan, Akkrah, and other portions of the Gold Coast, is six or seven times greater in magnitude, than that growing on the mountains of Sierra Leone, Fernando Po, and Kongo. The distinctions mostly conspicuous, are in the characters of the fruit and flowers. Variations in the form and outline of the expanded apex of the filaments, and in the color of different parts of the perianth, continue of frequent occurrence, but are not deemed to be of any special value by botanists. The capsules and seeds however present a greater uniformity of shape, and their essential peculiarities are more permanent, the deviations that appear, proceeding rather from an abnormal condition of development and other extraneous agencies than from natural causes. Artificial culture in colder climes apparently exercises an unfavourable effect on the growth of these plants, and induces changes never perceptible in their normal state. Thus the *A. Mallaguetta*, though beautifully delineated in Roscoe's great work on the order to which it belongs, and represented to have been faithfully figured from living specimens produced in

England, would convey a very inadequate idea of the same production in its primitive wildness; and if the outlines of the comparatively abortive fruit, and the pale contracted flowers, were placed in juxtaposition with those growing in their native homes, the differences would be so obvious, that even an experienced observer would fail to detect any approach to similarity. These remarks are also partially applicable to other species reared by forced means, in stoves and hot-houses, adapted for these purposes.

As the fruit, leaves, and other component parts of the *Mallaguetta vera*, assume a diversity of proportions, their division may be conveniently arranged into three varieties, as follow, viz.—

Var. *a.*	*Mallaguetta vera.*	majus	*Amomum Melegueta.* Rosc.
b.	"	medium	"	*Granum Paradisi*, Afz.
c.	"	minus	"	*Granum Paradisi* (*montanum*).

A. Mallaguetta, majus.—The negroes of various countries in tropical Africa, have distinguished this Amomum by a peculiar title, expressly in contradistinction to the other species, all of which are comprehended under one general appellation. In Yorruba it is known by the name of *Attahre*, in Ebo as *Ussorgé*, at Akkrah, *Anniëwké*, in the Fante and Ashante kingdoms *Weeza* (*Ehuissa*, Barbot), and on the Kroo coasts by that of *Guetta*, or *Emaneguetta*, from whence has originated the term employed by the older voyagers and authors. Probably either this or the second variety is the *Teen-el-felfel*, of the Moorish traders of Soudan. This plant mostly grows in circumscribed patches, within the precincts of dense thickets, and in shady spots, well timbered, delighting always in the rich vegetable loams of level lands or plains, where it attains an altitude of five or six feet. The leaves are much broader and larger, and more ovately-lanceolate than those of the other varieties; frequently varying from 1½—2 feet in length, and from 2—4 inches in width. The flowers are invariably solitary, and exhale an exquisite fragrance. The outer rim of the labellum, and other portions of the corolla, are of a purple hue, imperceptibly paling in tint towards the germinal processes, and adjoining their insertion are changed in conjunction with the anthers, filaments, &c., into a rich golden yellow. The capsule in size xceeds all others, but the seeds are inferior in this respect to those of some species. When immature it is of a dark green, with the apex slightly dotted by red or brownish spots. As it gradually ripens and enlarges, a brilliant red or crimson colour supervenes. Coriaceous and somewhat oval in form, the surface of the external coat is at first smooth and polished, which, however, disappears by drying and becomes roughly corrugated. In their natural state these pods are variable in length. They ordinarily average from 3—6 inches long, and from 1½ to 2 inches broad; but these dimensions are reduced one-third, more or less, during their exsiccation. The seeds are roundish and bluntly angular, their external or cortical covering is singularly granulated, or of a warty-like aspect, of a deep red color (white within) with a pale yellow projecting umbilical process; and are embedded in a tomentose substance, entirely free from acidity. These kind of grains, esteemed the most valuable in commerce, were of limited exportation. They differ in taste from the seeds of the other Amoma by their peculiar fruity and grateful aromatic flavor; and while amply pungent, are at the same time destitute of that camphoraceous acridity, common to many closely allied species. This with their remarkable granulated surfaces, will answer as a ready means of distinction, independently of other characteristics, from the seeds of all other kinds in the markets. When the traffic in slaves was duly legalized, this pepper was purchased with avidity, by the European factors on the Gold Coast, expressly for the sick Koromantyns, and other natives during their voyage to the West Indies. Daily blended with their food, the remedial and stimulant action arising from its regular administration, soon exerted a beneficial effect in dispelling that constitutional despondency and languor, with which these class of slaves were so often afflicted. If the plant cultivated in Demerara and other West Indian colonial

settlements, be the same as this, the introduction and subsequent naturalization may be feasibly attributed to these irregular importations. I am inclined to believe, however, that the Akkrah variety of this pepper, will be found to have several distinctive features, not common to other varieties, elsewhere. The second part of the connected botanical description is by Dr. Hooker, and more strictly pertains to var. *b*, or specimens from Sierra Leone.

Flores Solitarii.

1. Amomum *Melegueta*, Roscoe, Mon. Plants. Foliis auguste lanceolatis vaginis gracilibus, scapo 1—floro, bracteis lineari-oblongis cuspidatis, perianthio exteriore spathaceo acuminato, interiore foliolo dorsali oblongo, lateralibus e basi lanceolata sensim acuminatis, labello late obovato-quadrato margine undulato crispato, filamenti processubus lateralibus subulatis, antheræ lobo terminali subtriangulari apice integro obtuso dentato v. bifido angulis lateralibus subelongatis subulatisve, ovario glabro, staminodiis liberis subulatis, fructu ampullaceo ovato v. elliptico-oblongo glabro, perianthii tubo æquilongo coronato, seminibus angulato-globosis pallide brunneis, testa nitida verruculata. *Pereira, in Pharm Journ., v.* 6, *p.* 412. *Mat. Med., v.* 2, *p.* 1131, *f.* 235-241. *Guibourt Hist. Nat. des Drogues Simples, v.* 2, *p.* 222. Hab. Accra, Yorruba, and Sierra Leone. *Dr. Daniell.* Nom. vern. "Attare" *(Attahre, Yorruba)*, West Africa, and "Tokolo nipomah" *(m' pomah)* of Fernando Po.

Folia angusta, basi acuta, apice longe acuminata, spithamœa ad bipedalia, læte viridia, nervis costa parallelis, ligula truncata brevi, vagina valde elongata. *Scapus* sæpissime valde arcuatus, gracilis, 2—4 unc. longus. *Bracteæ* numerosæ subdistichæ, appressæ, 1—2 unc. longæ, apice rotundatæ et cuspide basi lata dorsali instructæ, luride virides. *Flores* odori, magnitudine variabiles. *Perianthii* interni *tubus* foliolis æquilongus utrinque sulcatus, foliolo dorsali multinervi, labello albido, extus marginibusque purpureo tincto, intus secus medium aureo. *Antheræ* lobo terminali albido, marginibus roseis. *Staminodia* subulata acuta v. emarginata. *Stylus* dorso incrassatus, stigmate aureo. *Fructus* carnosus, 1—5 unc. longus, forma varia, elliptica, ampullacea, oblonga, v. ovato-oblonga v. obpyriformis, glaberrima, pulpa carnosa. *Semina* valde aromatica et pungentia, $\frac{1}{8}$ unc. longa, colore varia, intensiore v. pallidiore, areola conica ad hilum plus minusve elongata lutea v. subnulla.—*Hook. Journ. Bot., p.* 293.

b. Mallaguetta medium.—The second kind of the true Mallaguetta chiefly grows on the hilly declivities of Sierra Leone, Sherbro, and circumjacent districts, but may also be met with in some parts of Soudan, Yorruba, Bambarra, Liberia, Kroo, and other maritime countries of Western Africa. It is the *A. Granum Paradisi* of Afzelius, and the *Tosshan te Timmané*, or Timmane pepper of the Bulloms and Timmane settlers. By the Akoos it is likewise termed *Attahre*, by the Soosu's *Niammakyu*, and inland Mandingo tribes *Bellankufo*. It is the *Tamar-el-felfel* of the Arab and Moorish merchants. This variety, although affording a close approximation to the preceding, never attains that luxuriance of development, and offers a few deviations deserving notice. The leaves are smaller and more lanceolate-acuminate, rarely exceeding 1—1½-feet in length, and 1—1¼-inches in breadth. The upper circumference of the corolla is purple, but the inferior portion, with the anthers, filaments, &c., and other adjoining organs of fructification, of a rich golden color. The apex of the filament is generally lobed, or assumes a somewhat fanlike expansion, the irregular margin of which is beautifully tinted with crimson, and differs not only in these respects, but in being larger and not possessing the bifid characters of Roscoe's plant. The capsule in its dried condition is deeply corrugated, rounder or more globular in outline, dark brown, about one-half and sometimes considerable less in magnitude than the former. When green, the apex and bracts are spotted by ruddy brown. The seeds are also less plump, have not the projecting umbilical tuft peculiar to the Akkrah variety, and though endowed with aromatic and fruity flavor, enjoy it in a lesser degree. They are

moreover of a yellowish or paler red, and more angular, but agree in other respects. This plant is commonly cultivated in the gardens of Sierra Leone, by the colonists, and is stated to have been originally brought from the Yorruba kingdoms. It appears, nevertheless, to be indigenous to the hilly districts of Sierra Leone. The pods, when collected by the natives, are immediately suspended over the fire from the roof of their huts, and on this account sometimes acquire a black or sooty-brown tint. These measures were deemed necessary to effect their perfect cure, and to avert the ravages of insects. The seeds are sold in the markets of Sierra Leone at the rate of 1*s.* 6*d.* per pound. The leaves and fruit are correctly illustrated in Nees ab Esenbeck's *Icones Plantarum Medicinalium*.*

The Ako's, or inhabitants of Yorruba, who, from a special aptitude and shrewdness for business, are said to resemble their Hebrew brethren, and have, therefore, been termed the Jews of Africa, seem to have been actuated by a determination to secure a monopoly of these grains; and to prevent, if possible, their diffusion by growth throughout the circumjacent countries, invariably gathered the capsules in an unripe state, and immersed them for some time in boiling water. This process was designed to effect a twofold object, viz., the destruction of the germinating principle of the seeds, consequently rendering them useless as a means of propagation, and to answer as an efficient system, for preserving them from an inherent decay, if retained beyond their customary period of sale. The fruit by this mode of exsiccation becomes laterally compressed, or more elongated in shape, the external coat being converted into a pale brown colour, wrinkled by minute convolutions, and of a soft and somewhat sponge-like texture. The seeds, from barely obtaining their proper maturity, though not deficient in pungency, are much less in size to those produced on the Gold Coast. These peculiarities will serve to distinguish the pods procured in Yorruba, from all other kinds observed in the African depôts. Pereira has given a good representation of this variety (Yorrubean) from a specimen belonging to the Sloanian collection of the British Museum.† The annexed description is from Afzelius' *Remedia Guineensia*, with the dissertation of Ortenblad on its botanical characters:—

AMOMUM *Granum Paradisi?* LINN.

Timmenensibus Tossàn, *Bullomensibus* Eschòug, *Susuensibus* Jammaqui, *Britannis*, *Americanis* et *Colonis*, Malaguetta Pepper, sive Grain of Paradise. *Floret* Octobri et Novembri, atque semina *maturat* Maio et Junio anni sequentis: *Stirps* quod ad omnes partes glabra, parum nitida. *Radices* in superficie terræ longe lateque repentes, striatæ, annulatæ, squamosæ, fibratæ, fuscæ: *fibris* longis, sordide buxeis, in simplices, ut ajunt, *fibrillas* divisis. *Stolones* laterales longissimi, squamosi e ferrugineo castanei inferue prostrati, superne adscendentes, tandem fortassis radicentes et in caules futuros surgentes. *Caules* veri centrales, interdum tripedales, erecti simplices, basi tumidi inferne squamosi, superne foliati, nunc floriferi, nunc steriles. *Folia* longissime vaginantia: *vaginis* striatis xerampelinis, spithamæa, alterne disticha lanceolata, longe acuminata. *Scapi* 1—3 e collo radicis, infra caulis tumiditatem et vix vel parum supra terram, enati, admodum pollicares, imbricati *squamis* parvis sed sursum majoribus, alterne distichis, appressis, striatis, obtusis, castaneis. *Flores* solitarii magni albi (?) ad basin tecti *squamis* spathaceis 5—6 imbricatis castaneis, intima Germen, Corollæque tubum proxime amplexa albida, *Spatha propria* dicenda. *Corolla*, *Stamina* et *Pistillum*, ad generaliora quod attinet, ut in *Amomo* exscapo a Doctore Joh. Sims descripto, vid. *Ann. of Bot.*, *vol.* i., *Lond.* 1805. 8: 0 *p.* 548, *t.* 13. *Fructus* 2—3 pollicaris, oblongus, non nihil anceps, inferue una cum pedunculo brevi squamis ut in Flore sed majoribus, crassioribus, pallidioribus et laciniis præterea Corollæ duabus minoribus, quamdiu in caule residet,

* *Pl.* 65. † *El. Mat. Med.*, *3rd ed.*, *v.* 2, *f.* 241.

tectus, apice in cylindrum longum membranula spathæformi terminatum productus, maturus aurantiacus, intus ut fructus *Amomi latifolii* supra *pag.* 6, descripti tripartibus, cet. *Semina* ut ejusdem *Amomi*, sed minora subrotunda indefinite polyëdra, tuberculis rugisque minutis inæquabilia, subnitida, badia, intus nivea, &c. *No.* x., *p.* 71.

c. Mallaguetta minus. The third, or alpine variety, from the elevated regions where it abounds, is always of a stunted growth, and in general appears of such restricted proportions, as to lead to the inference of its being a distinct species. In some localities the plant bears more the appearance of the ginger, or larger gramineous products, the stem seldom exceeding the elevation of two feet, and the leaves never attaining the dimensions of the previous varieties. The fruit equally participates in the scale of reduction, and in size becomes so diminutive, as to be considered (perhaps with a solitary exception) the smallest of the fruits at present known among the African Amoma. The pod at first green, gradually merges into a buffy, and when ripe becomes converted into a crimson color, as in most other species. The testaceous coat is less coriaceous, and much thinner than the larger kinds. The capsules in their dry state vary from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in length, and from 4 to 8 lines in breadth, are pale brown, sparingly corrugated, and contain a few small, dark red, granulated roundish and slightly angular seeds, considerably less in magnitude, but corresponding in flavor, qualities, and characters with the two preceding varieties. The flowers, moreover, less tinged with purple, are of a whitish or more delicate pink hue.

The time of the appearance of the flowers of these kinds of *A. Granum Paradisi*, evidently varies, according to their location. The evolution of the Gold Coast and Fernando Po varieties, may be noticed in the rainy months, viz., in June, July, and August; but in Sierra Leone I have gathered them in January and February. Possibly they would appear at all seasons of the year, if such were situated in places plentifully supplied with moisture.

In Fernando Po this fruit is called by the Boobies *Tokolo M' pomah*, or *M' pomah* pepper. *Tokolo* is their ordinary term for pepper. In the Kongo Angola, and other neighbouring territories southward of the equator, similar compound designations are in vogue, the natives usually terming it by those of *Dungo* (pepper)-*zarzo*, and *Dungo-zenzambah*. According to the older Portuguese writers, these grains of Paradise were known in Loango, by the name of *Indongo anpota*. Barbot observes that the natives in the vicinity of Cape Lopez and Gabon river call it *Calicute*. Considerable quantities of this pepper are transmitted from the interior, to the coastal towns for sale, the pods being strung on cords or withes, and in this state of preservation are often kept for a number of years.

The multifarious uses of the Mallaguetta pepper among the negro communities of tropical Africa, furnish conclusive evidences of the esteem in which it is held. In localities where a large supply can be produced, the surplus is exported with other indigenous commodities to remote and unknown regions, while in the native markets it is usually included with other vegetable substances, as one of the domestic articles of traffic. The variety of medicinal and other economic appliances, to which this pepper is devoted by the aboriginal populations, indicate their profound appreciation of its remedial powers and value. In consequence of the aromatic principle, pervading more or less every portion of the plant, the leaves, roots, and other structural fragments, are rendered equally available for similar useful purposes as the seeds. To obviate the necessity of entering into a series of complicated details relative to each of the preceding varieties, it will perhaps be advisable to embrace under one summary account, their ordinary employment, briefly adverting to the countries where their application is more extensively advocated by the native Africans, commencing in those to the north, and descending along the coast, subsequently to those southward of the equator.

From the circumstance of the natives asserting that none of the *Mallaguetta*

vera, has hitherto been observed in any of the maritime districts of the Senegal and Gambia, some doubt exists whether this species is really indigenous to these rivers, the principal stock offered for sale in the towns, having been indirectly imported from Sierra Leone and Yorruba, by means of coasting vessels. The Mandingoes, however, state that the plant luxuriantly flourishes in Bondu, Bambarra, and other inland countries; and this is the more probable since the roots, packed in bundles, are frequently brought to Janjamburie (McCarthy's Island), Upper Gambia, from some distance eastward by the *Loobies*, a nomadic negro, or gipsy race of wanderers, and exchanged for European commodities. The Futah-foulahs and Mandingoes term it *Bellankufo*. By them it is highly extolled for certain purgative and vermifuge properties, and is exhibited in the form of a strong infusion, made by the following process:—The roots are first thoroughly cleansed, cut into small pieces, and mixed with a little salt, the whole being well pounded in a paloon or wooden mortar, which, after their amalgamation into a mass, is dissolved in hot water. When this mixture has become cool, the liquid is poured off, filtered, and taken in draughts of half a pint or more, this being deemed an appropriate dose, the inhabitants usually manifesting a certain amount of dread, said to result from their violent action, as on several occasions they aver, that an improper use of this medicine has been attended by fatal results. The marabouts and country doctors have therefore laid down the rule, that they always should be given with extreme caution, and then only when the person is in robust health, and free from any morbid debility. Their administration appears to have subsequently induced considerable torpor or constipation of the bowels, conditions which are known to follow the exhibition of other drastic purgatives, of African preparation, and which, from their regular employment in large doses, have caused severe diarrhœa, exhaustion, and not unfrequently death.

The intervening tract of country between the Gambia and Rio Nunez, is reported to yield a very meagre supply of this pepper, but from the latter river to the rich and fertile midland districts extending to Sierra Leone, the Mallaguetta and other species of Amomum are known to exuberantly abound, in their wild state, and are more or less plentiful in those umbrageous spots, most propitious for their growth.

The popular appliances of the Mallaguetta pepper in the colony of Sierra Leone, and in the neighbouring Timmané and Soosu settlements, have been partially mentioned by Afzelius in the *Remedia Guineensia*. He remarks that, independently of various economic uses, it was largely prescribed in several diseases, such as diarrhœa, dysenteria, angina, frambœsia, and also as a laxative to evacuate the meconium in infants. Winterbottom occasionally alludes to the seeds being administered, in conjunction with other remedies, for the cure of sickness, and that they were sometimes eaten with the fruit of the Kola-tree, to increase their bitterness and tonic powers. As an active component in different medicinal compounds, this product is often resorted to in enlargements of the joints, rheumatic affections, and tumors; colic, vermes, cynanche tonsillaris and parotidœa, krakra, and many other cutaneous maladies. The leaves and stems of the plant may frequently be seen in the markets of Sierra Leone, in small bundles for purchase, and apparently in lieu of the pods, when the latter are out of season. Employed in the concoction of strong infusions, they are stated to partake, only in a minor degree, of the same stimulant and aromatic virtues as the seeds.

From Sierra Leone to Liberia, and from thence along the Kroo-shores to Assine, the prolific development of this production, admits of a more extensive application to the native wants and usages. On the Gold Coast, and especially in Ashante, it is universally valued by all grades of people, and is constantly given in most of the endemic diseases of these countries. Among the Fante and Adampe tribes, a preparation of this pepper with lime juice, comprises a favourite remedy in dysentery, colic, and other gastro-enteritic disorders, and

has been stated to have proved very efficacious in relieving the tormina, and tenesmus, when conjoined with hot fermentations externally. The seeds when converted into a fine powder, are rubbed over the forehead and other parts of the cranium, in dementia, delirium, cephalalgia, and puerperal mania, and are likewise used in bronchitis, pains of the limbs, side, and different portions of the body.

In the Bights of Benin and Biafra, the *Mallaguetta vera* has been found to be as fully serviceable, as in the preceding countries, and seems to be held in continual requisition by the aboriginal races, both for dietetic purposes and in the treatment of disease. In Fernando Po, the *Boe-yah-mo*, or island practitioners, triturate the seeds with palm oil or some unctuous earth, and by friction over the ailing part, endeavour to alleviate the rheumatic head-ache and other affections of the body, which the climatorial vicissitudes of rain and cold, tend not unfrequently to engender.

In Loango, Kongo, Ambriz, and other kingdoms situated southward of the equator, between Cape Lopez and St. Paul de Loanda, this pepper enjoys no ordinary celebrity, and has been diverted to an infinite variety of purposes. In ophthalmia, and cerebral affections, the seeds, after their reduction into a pulverulent condition, have been employed as a sternutory, either alone or combined with other substances; and in the milder cases, has been said to be productive of benefit. The seeds are likewise chewed into a pulpy mass by the *Ganga's*, and inserted within the *Meatus externus*, in otitis, otalgia, and for the relief of other organic derangements of the ear. Combined with emmenagogue medicines they have been occasionally resorted to, in the after stages of parturition, and also to promote the flow of the catamenia in cases dependent on functional irregularity. For their carminative effects they have also been administered as an adjunct in several cathartic and diuretic compounds, with the view of modifying their drastic or irritative action on the intestinal canal. In these and other countries where the fruit is not difficult of attainment, there are few remedial preparations among the native African tribes, in which it does not constitute, more or less, an ingredient.

(*To be continued*).

CHEMICAL EXAMINATION OF THE *CUBEBA CLUSII* OF MIQUEL;

THE BLACK PEPPER OF WESTERN AFRICA.

BY JOHN STENHOUSE, LL.D., F.R.S.

A few months ago Frederick Desnaux, Esq., African merchant, kindly presented me with a quantity of these cubebs imported, I believe, from Abbeocouta, in Western Africa.

As considerable doubt has long existed respecting the true nature of these African cubebs, most botanists regarding them as a peculiar species of cubebs, while others believe them to be a kind of pepper to which they have given the name *Piper caudatum*, or tail-pepper, I was induced to take up the subject in order to see if Chemistry could throw any light upon the matter.

The smell of these African cubebs is very similar to that of ordinary cubebs, but their taste approaches very closely to that of common pepper.

The powdered cubebs were digested with wood-spirit, and the spirit drawn off by distillation. The residuum obtained in this way was dissolved in alcohol, to which a strong solution of caustic potash was added. The addition of the potash lye precipitated a brown coloured oil, which, on standing for some time, yielded crystals. The mother-liquor, when treated with a new quantity of potash-lye, furnished a second precipitate, from which crystals were also obtained.

The crystals, after being collected, were dried by being strongly pressed between folds of blotting-paper, and were then repeatedly crystallized out of spirit

of wine. The crystals purified in this way were of a very considerable size, being about a quarter of an inch in length and nearly colourless. Their form was that of oblique, four-sided prisms, precisely similar to piperine. They are very soluble in hot spirit of wine, pretty soluble in ether, but insoluble in water. When distilled with caustic potash they yield a volatile base, which has the characteristic odour of piperidine.

The subjoined analysis of these crystals demonstrates that they are identical with piperine:—

I. 0.2160 grms. gave 0.5690 grms. of CO_2 and 0.1285 HO.
II. 0.2325 grms. gave 0.6105 grms. of CO_2 and 0.1405 HO.
III. 0.5235 grms. burnt with soda-lime, gave 0.1755 platinum.

CALCULATED.	ANALYSIS.			
	Regnault.	Gerhardt.	Laurent.	Stenhouse.
C_{68} 71.58	71.04 ..... 71.34	71.52	71.66	71.84 ..... 71.61
H_{38} 6.67	6.72 ..... 6.84	6.66	6.66	6.61 ..... 6.71
N_2 ..... 4.91	4.94 ..... —	4.82	—	4.76 ..... —
O_{12} 16.84				

It appears, therefore, that whatever may be the botanical characters of African cubebs their chemical properties indicate that they are really a species of pepper, containing as they do piperine and not cubebin, the non-nitrogenous crystallizable principle of the cubeb tribe, which possesses no basic properties.

ON THE ACTION OF ORGANIC ACIDS ON COTTON AND FLAX FIBRES.

BY F. CRACE CALVERT, M.R.A. OF TURIN.

I AM induced to publish the facts contained in this paper as they may prove useful to our calico-printers. Organic acids much used in print works have a marked destructive action on cotton and flax fibres, nay, almost as marked as those presented by weak mineral acids.

My attention was drawn to the above subject by having a cambric handkerchief placed in my hands for examination, the texture of which was injured in all such parts as had been in contact with an isinglass jelly, sold by a confectioner as made from calves' feet. I soon ascertained that the jelly had been clarified with tartaric acid, and not with any mineral acid; therefore I made series of experiments with jellies prepared by myself, and compared them with others procured from some of the most respectable confectioners of our city, and I found as a rule that cambric linen was materially injured when it had been dipped in such a solution, dried in the atmosphere, and then heated to 126° C.

As this interesting fact involved a question of great practical value to the calico-printer, I deemed it my duty to examine carefully the action of various organic acids on fibres, and I shall proceed to lay before the meeting the results of my inquiry.

The first question which presented itself was, if the injury of the fibres arose from the tartaric acid contained in the jellies, or if it was to be attributed to the mechanical effect of a solid substance interposed between the fibres of the fabric and interfering with their ordinary elasticity, and thus rendering them brittle. To appreciate the influence of tartaric, citric, and oxalic acids,* I dipped small pieces of cambric and muslin (previously well washed in distilled

* These acids were carefully purified and completely free from mineral acids.

water) into a solution containing two per cent. of tartaric or oxalic acids. The pieces were then dried in the atmosphere, and exposed for an hour to various temperatures, and the following results were obtained:—

	80° C.		100° C.		126° C.	
	LINEN.	COTTON.	LINEN.	COTTON.	LINEN.	COTTON.
Immersed in water alone	uninjured	uninjured	uninjured	uninjured	uninjured	slightly injured
Water containing 2 per cent. of Tartaric Acid	ditto	very slightly injured	ditto	very slightly injured	ditto	ditto
" " Citric Acid	ditto	ditto	very slightly injured		slightly injured	
" " Oxalic Acid	rather injured		more injured		very much injured	

This table illustrates an interesting fact, viz., that while two per cent. of tartaric and citric acids have but a slight action on cotton and flax fibres at 80°, 100°, and 126° C., oxalic acid has, on the contrary, a marked injurious effect, for the slightest effort is sufficient to tear the fabric. In fact, the fibres were nearly as much injured as if they had been acted upon by a weak mineral acid.

To ascertain what quantities of citric and tartaric acids were required to weaken materially cotton and flax fibres, I employed solutions of these acids containing four per cent. of each, and pieces of fabrics were dipped in such solutions, dried in the atmosphere, and submitted to the action of heat.

	80° C.		100° C.		126° C.	
	LINEN.	COTTON.	LINEN.	COTTON.	LINEN.	COTTON.
Containing 4 per cent. of Tartaric Acid	slightly injured	slightly injured	very much injured		much injured	
" " Citric Acid	very slightly injured		much injured		much injured and very slightly discoloured	
" " Oxalic Acid	much injured		very much injured		quite rotten	

These results left no doubt that two per cent. of oxalic acid acted on the fibres with still more intensity than four per cent. of citric and tartaric acids. At the temperature of 126° C. all the fabrics presented a scorched appearance, and those with tartaric and citric acids had assumed a much browner tinge than with oxalic acid.

To be enabled to form an opinion, if the colouration of the linen was owing to the action of the acid on the fibres, or to partial decomposition of the acid itself, I took some of the scorched pieces of fabric and boiled them with distilled water. The colouration not disappearing, I added a little caustic alkali, but without any better results. I therefore concluded that the colouration of the fabric was attributable to the action of citric and tartaric acids, or to some of their derivative compounds.

The next series was made by dipping for a few minutes pieces of fabric in solutions of isinglass, glue, gum, and starch of the best quality, and having a sp. gr. of 1.020 at 37° C. These pieces, well pressed, and dried in the air, were submitted to the influence of heat.

	80° C.		100° C.		126° C.	
	LINEN.	COTTON.	LINEN.	COTTON.	LINEN.	COTTON.
Solution of Glue	uninjured	uninjured	uninjured	uninjured	uninjured	
" " Gum	ditto	ditto	ditto	ditto	ditto	
" " Isinglass	ditto	ditto	ditto	ditto	ditto	

These pieces were found to be rather weakened, but the action was very slight; and if the pieces of fabrics were exposed to the atmosphere for a few hours, they resumed nearly their ordinary strength; or if the stiffening substance was washed out, the fabric recovered its primitive strength.

As in calico-printing, oxalic, citric, and tartaric acids are applied to fabrics when mixed with a stiffening substance, a series of experiments was made with solutions of tartaric, citric, and oxalic acids, thickened with gum and starch, and I discovered that the presence of the latter substances greatly

increased the action of the above acids when employed in the proportions of from two to four per cent., and added to their scorched appearance on cotton and flax fibres. The following were the results observed :—

	80° C.		100° C.	126° C.	
	LINEN.	COTTON.	LINEN. COTTON.	LINEN.	COTTON.
GLUE, Containing 2 per cent. of Tartaric Acid	slightly injured	apparently uninjured	much injured	very much injured	slightly carbonized
" " Citric Acid	very slightly injured		not much injured	still very strong	
" " Oxalic Acid	injured				
GUM, Containing 2 per cent. of Tartaric Acid	slightly injured		more injured than the corresponding experiments with glue	very much injured, and of a brown tinge in parts	
" " Citric Acid	very ditto	ditto	not much injured	slightly discoloured in parts	
" " Oxalic Acid	much injured		very much injured	tenacity quite destroyed	
ISINGLASS, Containing 2 per cent. of Tartaric Acid	very slightly injured		not much injured	much injured but not discoloured	very slightly discoloured
" " Citric Acid	not perceptibly injured	very slightly injured	slightly injured	injured but not discoloured	ditto
" " Oxalic Acid					

The above experiments having been undertaken with the view of throwing some light on what happens sometimes with fabrics printed with the above acids, and passed over heated cylinders or plates, I therefore deemed it advisable to inquire into what would be their action when applied on goods which were simply dried in the atmosphere, and afterwards steamed, as often is the case in block-printing. For this purpose I prepared two series of experiments, similar to those above described, taking care to separate the specimens by first wrapping each in paper, and then placing them between folds of white calico. These samples, so arranged, were then submitted respectively for half an hour to steam having 3, 12, and 45 lbs. pressure.

The facts observed were most surprising, as the fibres were much more injured than when they had been submitted to dry heat.

	Steam pressure of 3 lbs.	45 lbs.
Water alone	uninjured	uninjured
" + 2 per cent. Tartaric Acid	slightly injured	much more injured
" + 4 per cent. " "	ditto	ditto
" + 2 per cent. Oxalic Acid	very much injured	rotten
" + 4 per cent. " "	rotten	very rotten
Gum alone	uninjured	uninjured
" + 2 per cent. Tartaric Acid	not more injured than water + 2 per cent. Tartaric Acid	sightly injured
" + 4 per cent. " "	same as 4 per cent. Tartaric Acid and Water	injured, but still rather strong
" + 2 per cent. Oxalic Acid	rather more injured than water + 2 per cent. Oxalic Acid	rotten
" + 4 per cent. " "	very rotten	very rotten
Starch alone	uninjured	uninjured
" + 2 per cent. Tartaric Acid	hardly injured at all	slightly injured
" + 4 per cent. " "	very slightly injured	rather more injured
" + 2 per cent. Oxalic Acid	not more injured than water + 2 per cent. Oxalic Acid	rotten
" + 4 per cent. " "	ditto + 4 per cent. Oxalic Acid	very rotten
Water + $\frac{1}{2}$ per cent. Sulphuric Acid	can hardly be handled—fall to pieces in the hand	not tried
" + $\frac{1}{2}$ per cent. " "		

These facts will, I hope, induce calico-printers to avoid the employment of these free organic acids in their steamed goods, and to substitute as often as possible neutral salts. I shall conclude this paper by stating that I succeeded about eighteen months ago in applying successfully in my laboratory the difference of action presented by weak mineral acids on animal and vegetable

fibres, which difference consists in the facility with which cotton and flax fibres are destroyed comparatively with wool. These facts have acquired some importance in consequence of the great quantity of fabrics which of late years have been made with a mixture of these fibres, and as the rags resulting from such manufactured goods are useless to the paper manufacturer, the useful employment of the wool is a matter of commercial importance.

ON THE ALOES ORDERED IN THE PREPARATION OF PILULA COLOCYNTHIDIS COMPOSITA AND DECOCTUM ALOES COMPOSITUM, P. L.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I observe that your correspondent, Mr. Southall, in the last number of the Journal, page 321, has fallen into an error with regard to the aloes ordered to be used in the preparation of the compound colocynth pill. It is the extractum aloes purificatum, formerly known as extractum aloes aquosum, and in the last Pharmacopœia as extract of aloes, that is ordered, and not, as stated in his formula, "powdered hepatic or Socotrine aloes."

I am desirous of calling attention to this, as I believe that many persons unintentionally prepare the pilula and extractum colocynthidis comp. in this way erroneously, and that this accounts in a great measure for the difference in the strength of the pill or extract, obtained from different sources, even more than any variation in the produce of the simple extract of colocynth, as if prepared with the purified extract of aloes, it would be nearly double the strength (so far as the aloes are concerned) of that made with the hepatic or Socotrine aloes of commerce.

This mistake arises from the various alterations in the name of the extract of aloes in the last three Pharmacopœias. In the Pharmacopœia of 1824 the Socotrine aloes of commerce was called extractum aloes spicatæ, and the extractum colocynthidis compositum, and also the decoctum aloes compositum of that date, were both prepared with it. In the Pharmacopœia of 1836 we no longer find the aloes of commerce designated extractum aloes spicatæ, but simply aloes; and the extractum aloes purificatum is now ordered in the extractum colocynthidis compositum instead of extractum aloes spicatæ, as in 1824; the wording of the formula for decoctum aloes compositum remaining the same as before, viz., extract of aloes, an indefinite name under the existing alteration, as it was applicable to either, and I think most persons continued to prepare it with the Socotrine or hepatic aloes of commerce as before.

In the Pharmacopœia of 1851, we find the name of extractum aloes purificatum altered to the more simple one of extract of aloes; and I have no doubt that many persons, seeing the words in the formula for pilula colocynthidis composita "extract of aloes," and not being aware that it is the new name for what was before extractum aloes purificatum, think that the College have returned to the old extract of aloes, or "powdered Socotrine aloes," and prepare their pill or extract with it accordingly.

This alteration of the name of extractum aloes purificatum to extract of aloes, no longer leaves us in doubt as to which to use in the preparation of the decoctum aloes compositum, although I cannot help thinking that its introduction in this case is more accidental than intentional, the wording of the formula for decoctum aloes compositum remaining the same through the three Pharmacopœias. The use of this preparation in the decoctum aloes compositum must be pronounced by all to be a great improvement in every way, and its purgative action, moreover, nearly doubled, complaints being constantly made before of the inertness of this preparation.

I have stated in the foregoing that the purgative action of both pilula colocynthidis composita and decoctum aloes compositum (so far as the aloes are con-

cerned) are nearly doubled by thus using the extractum aloes purificatum, as I have been for some years accustomed to prepare it in large quantities, and find the average produce but little more than half the weight of aloes used, and in some of the sott red Socotrine aloes less than half the weight; and as the resin of aloes separated is inert as a purgative, the watery extract must necessarily be nearly double the strength of the other.

In conclusion, I agree with Mr. Southall, that the use of the resin of colocynth, instead of the simple extract, would insure a greater uniformity in the pilula colocynthidis composita, although the produce of simple extract I have obtained by cold water maceration from colocynth pulp, purchased at different times, has been singularly uniform.

I remain, Sir, yours truly,

WILLIAM MARKHAM COLCHESTER.

2, *Crown Street, Hoxton Square, London, January 11th*, 1855.

[Having communicated with Mr. Southall on the subject, we have received the following observations in reply, which appear desirable as an explanation.—ED.]

THE length of my communication was the principal cause of my not stating my reasons for preferring the aloes as imported, which were, in the first place, because the Edinburgh Pharmacopœia directs socotrine or East Indian aloes to be used—under which latter term I include the hepatic; and secondly, because aloein, or the supposed active principle of aloes, being only sparingly soluble in water, I do not see very clearly how the watery extract should be likely to contain a greater proportion of it than the aloes. I do not profess to be competent to form a judgment of the comparative efficacy of the two, but as far as my knowledge goes, I would rather trust to the efficacy of the imported article than to the watery extract. The extract should, of course, be used in making the compound colocynth pill of 1851 P. L., and I have invariably followed the direction of the Pharmacopœia in this respect.

INFUSUM CALUMBÆ CONCENTRATUM.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Although we do not consider the substitution of concentrated infusions justifiable in ordinary dispensing, the great use made of them by a portion of the profession renders the inquiry important; and after reading the remarks made at the December Pharmaceutical Meeting, with reference to infusum calumbæ concentratum, we have much pleasure in submitting our method of preparing it for the consideration of those who are interesting themselves in the matter, having for some time made this infusion, as it appeared to us, with more satisfactory results, in comparison with the freshly prepared than any other, rhubarb excepted.

Calumba root contains (according to M. Planché) one-third of its weight of starch, and its appearance upon the addition of boiling water leads one to infer that the fluid cannot act upon it very perfectly during the required time. From this fact our formula was framed in accordance with the instructions given for making the "Infusum Calumbæ" in the Ed. Ph., expressing the opinion of many medical men, that the recent infusion made by cold water is superior to that in ordinary use, and probably treating the root with water only, makes it more nearly resemble the infusion of the Pharm. Londinensis than if a portion of spirit were employed with it.

Rad. Calumbæ Elect., ℥x.
Aq. Destillat., 6 (℥xx.) pints.
Sp. Vini Rectif., f℥viij.

Reduce the calumba to a coarse powder, add sufficient cold water to form a soft pulp, allow it to remain for two hours, place it in a percolator, add sufficient distilled water gradually to produce f℥xxviij., which set aside. Pour over the root in the same manner the remainder of the water, and reduce this second product at a low temperature to f℥iv.; mix this with the first twenty-eight ounces, and add the

spirit. Lastly, strain, or leave for a few days, and draw off from the slight deposit.

With two or three exceptions we do not think there is any comparison between recent and concentrated infusions, the former being so much superior. Infusum rosæ compositum, is, as Mr. Burden remarks, a tolerably good one.

King's Road, Brighton, 17th January, 1855. BARTON, BROTHERS.

ON THE USE OF COMMON RUE AND OF *PEGANUM HARMALA* IN GREECE.

WE extract from a letter which we have recently received from Dr. Landerer, of Athens, a few particulars regarding the employment of these plants in modern Greece.

Rue (*Ruta graveolens*, Linn.), called by the ancient Greeks Ρύτη, was, on account of its bitterness and powerful odour, a highly appreciated medicine, and as such repeatedly alluded to by Pliny. Besides its employment as an antidote to the juice of hemlock, it possessed a certain reputation as a strengthener of the eyes. Ovid alludes to this in his *Remedia Amoris*, line 801, "—— acuentes lumina rutas."* It is interesting that the Greeks up to the present time make use of small cataplasms of rue for strengthening the eyes. A fatty oil, called Πηγανόλαδον, into the composition of which rue enters, is likewise in use for various complaints. A distilled oil of rue is employed by the Turks.

Another esteemed rutaceous plant is *Peganum Harmala*, Linn., Πήγανον of Dioscorides (lib. iii., cap. liii.). Its properties appear to be narcotic, and to resemble those of *Cannabis Indica*; the Turks macerate its seeds in *scherbet* or *bosá*, administering the infusion internally. The plant is also applied in the form of a cataplasm in painful disorders of the stomach.

It likewise serves in the preparation of a yellow dye.

RASPAIL.

BY MR. JOSEPH INCE.

A REASONABLE doubt may be entertained as to whether the little books that profess to teach the public Medicine do so. Not that they cause much harm, for though elaborate directions are sometimes given on reducing fractures, and other higher branches of the art of healing, the anxious purchaser, in case of actual need, consults his own physician, leaving the Domestic Manual on the shelf.

Still there are certain plain instructions, with hints on familiar remedies, that have their use; nor does the Chemist raise the least objection, since he well knows that every household blest with such a guide, relies daily less on common sense, and more on physic.

Our neighbours, on the other side the Channel, trust in Raspail, as we do in Graham.

The one word *Camphor* would best describe the system. It is ordered in every shape, either used as snuff (*Camphre à priser*) or smoked in cigarettes, taken internally for almost all diseases, or exhibited in various forms as an external application. Camphor is the Proteus of Raspail's Hygiène. The French, who jest with everything, laughed even at the cholera, and when, during its ravages, it was asked despairingly, "Qu'en ferons-nous?" the answer was given in Raspail's words, "Camphorons nous, Messieurs."

An outline of the theory and practice of this strange but often successful

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* So Milton :—

"——— then purg'd with euphrasy and *rue*
The visual nerve, for he had much to see."—*Paradise Lost*, xi., l. 414.

[ED. *Ph. Journ.*]

mode of treatment would prove amusing, but not very useful. The best argument in its favour is its settled popularity. Indeed, it has met with such acceptance, that a few formulæ connected with it have passed into general use.

They are as follows:—

I.

Pommade Camphrée.—Camphorated Pomatum.

Adipis Recentis, ℥iij. ℥ij.
Pulvis Camphoræ, ℥j. ℳ.

Families who have no grated Camphor are directed to substitute for it two ounces of Spirit of Camphor, allowing the alcohol to evaporate before using the pomade.

II.

Camphor Cerate.

Adipis Recentis, ℥x.
Ceræ Flavæ, ℥iij.
Pulv. Camphoræ, ℥iij. ℳ. S. A.

III.

Vinaigre Camphré.—Camphor Vinegar.

Pulvis Camphoræ, ℥j.
Aceti Destillati, ℥xxxij. Mix.

Equal in importance, and far more frequently prescribed, is the cooling lotion, met with as "Eau Sédative (Raspail)." This is of three strengths:—

IV.—(*a.*)

Eau Forte.—Strong Sedative Water.

Liquor Ammoniæ, ℥iiiss.
Spirit. Camphoræ, ℥iij.
Bay Salt, ℥j. ℥j.
Aquæ Destillatæ, ℥xxxij.

Dissolve the salt in the water, with the addition of a few drops of ammonia; allow all impurities to subside, and add the clear liquor to the camphor and ammonia previously mixed together by agitation in a stoppered bottle.

This preparation is considered much too strong for ordinary use, and is intended only for veterinary practice.

V.—(*b.*)

Sedative Water, Medium Strength.

Liquor Ammoniæ, $2\frac{3}{4}$ ozs.
Spirit. Camphoræ, ℥iij.
Bay Salt, ℥j. ℥j.
Aqua Destillatæ, ℥xxxij.

This is seldom used, but when desired may be conveniently made by adding eight ounces of water to the former one.

VI.—(*c.*)

Eau Sédative Commune.—Common Sedative Water.

Liquor Ammoniæ, ℥ij. ℥j.
Spirit. Camphoræ, ℥iij.
Bay Salt, ℥j. ℥j.
Aquæ Destillatæ, ℥xxxij.

The effect of this remedy is described as nothing less than marvellous, its action depending partly on the absorption of ammonia and salt (the two great solvents of the coagulation of the blood) by the superficial vessels of the skin, and partly, of course, upon the camphor which it contains. By keeping, it acquires a smell of bitter almonds, and after a certain time a white powder is deposited. It is not then considered as unfit for use, but requires to be well shaken up before applying it.

Under the influence of this preparation fever is said to disappear, and endless maladies to be subdued. To what extent such statements may be true, it is not the province of a Chemist to decide.

31, *Southampton Street, Covent Garden.*

OZONE.

BY C. F. SCHÖNBEIN.

(*Concluded from page* 325.)

8. *Sulphurous*, *phosphorus*, and *nitrous acids* are rapidly converted by ozonized oxygen into sulphuric, phosphoric, and nitric acids, the hydrogen acids of iodine, sulphur, &c., are decomposed, with separation of the positive element, and ammonia is converted into nitrate of ammonia.

9. Both elements of a large number of sulphides are rapidly oxidized by ozonized oxygen, and converted into sulphates.

When strips of paper, saturated with sulphide of lead or copper, are suspended in moist ozonized air they are rapidly and perfectly bleached.

10. Ozonized oxygen liberates iodine instantaneously from the greater number of iodides, in the same manner as chlorine. Iodides of potassium, zinc, &c., are in time wholly converted by ozonized oxygen into iodates. It is a noticeable fact in this reaction that the iodine does not at once combine with six equivalents of ozonized oxygen, and form iodate in the same manner that sulphide of lead combines at once with four equivalents of ozonized oxygen forming sulphate of lead, but that iodine is in the first instance liberated. When, for example, fifty grammes of a solution of iodide of potassium, containing about 4 per cent. of the salt, are agitated with 30 litres of atmospheric air highly ozonized by phosphorus, the ozonized oxygen disappears immediately, and the solution acquires a tolerably deep brown colour, which is owing to the presence of free iodine, and does not again disappear. It therefore becomes a question in what state is the potassium that was in combination with the liberated iodine, for it cannot well be converted into potash since this could not co-exist with free iodine and would have given rise to the formation of iodate and iodide of the metal. I do not know how to account for this fact, although I have already expressed an opinion that a super-oxide of potassium is formed which is soluble in water and different from KO_3, and I have given reasons for holding this view.

One of these reasons is the fact that when hydrate of potash is ignited for a long time in contact with air it acquires the property of producing a deep blue when dissolved in water, and mixed with iodide of potassium, starch-paste, and sulphuric acid. Iodide of potassium likewise when ignited for a long time in contact with air—a treatment which effects the separation of some iodine—immediately produces a blue colour with starch-paste and dilute sulphuric acid, whilst the salt does not, under ordinary circumstances, present this reaction. I am unable to perceive any other mode of accounting for the liberation of iodine under these conditions, than assuming the formation of a superoxide of potassium. If this view is correct, ozonized oxygen produces, in contact with iodide of potassium, this superoxide with a separation of iodine, both substances being dissolved in the liquid. By the further action of ozonized oxygen the liberated iodine is oxidized to iodic acid, which, acting upon the superoxide of potassium causes the transfer of a portion of its oxygen to unaltered iodide of potassium, in consequence of which more iodine is liberated. It is obvious that iodide of potassium would be finally converted into its equivalent of iodate by six equivalents of ozonized oxygen, in case none of the iodine is lost. According to Baumert, ozonized oxygen is capable of decomposing even chlorides with liberation of chlorine, but this I have not been able to observe, although I have for many years been occupied with experiments on the action of ozonized oxygen upon chlorides.

It is scarce necessary here to repeat that the test-paper recommended for detecting the presence of ozonized oxygen is an application of the property which ozonized oxygen has of liberating iodine from iodide of potassium even in the solid state. It is best prepared in the following manner:—

The iodide of potassium used should, when mixed in very dilute solution with some starch-paste and a few drops of very dilute sulphuric acid, remain perfectly colourless, for a while at least. One part of this salt and ten parts of starch, are dissolved, with the aid of heat, in two hundred parts of water; the liquid filtered through linen, bibulous paper immersed in it, dried in a closed room, cut into strips, and preserved in a stopped bottle.

In using this paper to test for ozonized oxygen it should first be moistened with

distilled water, and then introduced into the vessel where the presence of ozonized oxygen is suspected.

11. The hydrated oxides of lead, cobalt, nickel, and manganese are converted by ozonized oxygen into superoxides. This reaction is best observed when strips of paper charged with these hydrates are immersed in ozonized oxygen.

12. Solutions of protosalts of iron, tin, and manganese rapidly absorb ozonized oxygen, and the oxides are thereby converted into peroxides.

13. Basic acetate of lead is converted by ozonized oxygen into neutral acetate, while a portion of the oxide of lead is converted into peroxide.

14. Ferrocyanide of potassium, solid or in solution, is converted by ozonized oxygen into ferricyanide and potash, and air, however strongly ozonized, immediately loses its odour when agitated with solution of ferrocyanide, while this acquires a deep yellow colour. Even a crystal of the ferrocyanide suspended in highly ozonized air, becomes red and moist in consequence of the formation of ferricyanide and separation of water in which the potash dissolves.

15. Upon the greater number of organic substances ozonized oxygen exercises an oxidizing influence, effecting a series of alterations which are not yet well understood, and which are worthy of investigation.

Highly ozonized air, agitated with solution of gelatine, albumen, blood, sawdust, &c., loses immediately its peculiar odour, and the property of liberating iodine from iodide of potassium. Finely powdered starch, agitated with ozonized air in a large flask, gradually acquires a very agreeable odour resembling apples. Coloured organic substances are bleached by ozonized oxygen in the same manner as by chlorine.

It is likewise worthy of remark, that a fresh alcoholic solution of guaiacum, containing only $\frac{1}{2000}$ of this resin acquires, in contact with ozonized oxygen, a deep blue colour, which soon disappears again.

My investigation of guaiacum has led to the conclusion, that this resin behaves with ozonized oxygen in a similar manner to starch with iodine. The ozonized guaiacum and the iodized starch resemble each other in more than one particular. Both are blue, and ozonized guaiacum readily yields the oxygen associated with it to the substances to which iodized starch yields its iodine, the change being attended in both instances with disappearance of the colour. For example, zinc in filings, agitated with moist iodized starch, destroys the colour and combines with the iodine; the same metal, agitated with tincture of guaiacum, coloured blue by ozonized oxygen, destroys the colour and combines with the oxygen. Moist iodized starch gradually loses its colour, owing to a further reaction of the iodine upon the starch and the formation of hydriodic acid; in the same manner ozonized guaiacum loses its colour spontaneously, owing to the action which takes place between the oxygen and the resin. So, likewise, there is an analogy between starch and guaiacum, in their great sensibility for iodine and ozonized oxygen, for alcohol containing only half a millionth of this resin is rendered sensibly blue by ozonized oxygen.

Ozonized oxygen is either not at all absorbed by water or only in the most minute quantity.

Quantitative Estimation of Ozonized Oxygen in Gases.

In order to estimate the amount of ozonized oxygen in a given volume of air, I have for some years employed solution of indigo, and numerous experiments have convinced me, that by this means the desired object is rapidly attained, for the amount of ozonized oxygen, in some litres of air, may be ascertained to within a small fraction of a milligramme in a few minutes.

The process is based upon the property which the solution of indigo in sulphuric acid has of colouring a proportionally very large quantity of water blue, and on the property which ozonized oxygen has of destroying this colour, and which ordinary oxygen does not possess.

The first requisite is a solution of indigo of known value, and I have found it convenient to employ one of which ten grammes are decolourized by one milligramme of ozonized oxygen. This is prepared in the following manner:—100 grammes of indigo solution, prepared according to the directions given by Berzelius, are mixed with an equal quantity of hydrochloric acid, and heated nearly to boiling. A solution of chlorate of potash, containing $\frac{1}{1000}$ of the salt, is then added gradually in small portions, and the whole agitated after each addition, until the liquid becomes

brownish yellow. If two milligrammes of the chlorate are required to destroy the blue colour of the indigo solution, it may be assumed that this effect is produced by means of the thirty-nine milligrammes of oxygen contained in the quantity of chlorate used, and consequently, that one milligramme of it is capable of destroying the colour of $\frac{39}{100}$ grammes of the indigo solution.

Then, in order to make this solution of such value, that exactly ten grammes are bleached by one milligramme of oxygen, 100 parts are diluted with 290 parts of water, and preserved in closed vessels completely filled.

To ascertain the amount of ozonized oxygen in thirty litres of air, ozonized to the greatest possible degree, by phosphorus, 300 grammes of the test solution are weighed, and about half this quantity poured into the flask containing the air. The flask is then well shaken. If the solution is decolourized a strip of moistened iodide and starch paper is introduced into the flask, and if this is rendered blue, more indigo solution is added, and the operation repeated as before. When the whole of the ozonized oxygen is absorbed, its amount may be calculated from the quantity of indigo solution required for the purpose. If 250 grammes of the test solution have been used, the quantity of ozonized oxygen which has effected the decolouration would be $\frac{10}{250}$ of a milligramme, plus that contained in the volume for air displaced by the 250 grammes of test solution. The correction of this error is made in the following manner:—In the first instance, a larger quantity of test solution is poured into the flask than is supposed to be sufficient for the absorption of the ozonized oxygen, and its volume is deducted from that of the gas. After ascertaining, by means of the test paper, that all the ozonized oxygen is absorbed, the liquid is poured into a small beaker, mixed with hydrochloric acid, and a chlorate of potash solution, of known value, added until the blue colour is destroyed. Then, from the quantity of chlorate used, the amount of unaltered indigo solution is ascertained; and likewise, by difference, the quantity bleached by the ozonized oxygen.

Thus, if 500 grammes of test solution are poured into the flask of air, and fifty milligrammes of chlorate of potash are required forperfect destruction of the blue colour, then the 19.5 milligrammes of oxygen contained in that quantity of the salt would have destroyed the colour of $10 \times 19.5 = 195$ grammes of indigo solution, and consequently the ozonized oxygen would have destroyed the colour of $500 - 195 = 305$ grammes of the test solution, and the quantity of ozonized oxygen would be $\frac{10}{305} = 30.5$ milligrammes.

If the volume of air for a temperature of 32° F., and a pressure of 76 centimetres was 30 litres, and the weight of ozonized oxygen found amounts to 30 milligrammes, the air would contain by weight $\frac{1}{1298}$ of ozonized oxygen, for under these conditions a litre of atmospheric air weighs 1298 milligrammes, and there is in this quantity one milligramme of ozonized oxygen. Weaker test solutions may be used, of which 10 grammes are equivalent to $\frac{1}{10}$ or $\frac{1}{100}$ of a milligramme of ozonized oxygen.

By means of the solution of indigo in sulphuric acid a number of facts may be ascertained with regard to ozonized oxygen that would otherwise be inaccessible. Thus, for instance, I have found, that atmospheric air containing one five-hundred-thousandth part of ozonized oxygen has a distinct odour of this substance, about as powerful as the air surrounding a metal point, from which a considerable electrical discharge is passing. This circumstance renders it probable that this degree of dilution is tolerably distant from the limits of recognition by the smell, and that one-millionth of ozonized oxygen may be detected in atmospheric air by the smell.

The amount of oxygen which a given quantity of phosphorus is capable of ozonizing by contact, I have found, by the above method of estimation, to be 0.430 of the phosphorus, exclusive of the oxygen, which enters into combination with the phosphorus as phosphoric acid.

I have likewise found, that atmospheric air may be so highly ozonized by phosphorus as to contain $\frac{1}{1300}$ of ozonized oxygen.

Annalen der Chemie und Pharmacie, xiii., 257.

THE QUICKSILVER MINES OF OLD AND NEW ALMADEN.

Quicksilver, or mercury, has been known from the earliest ages, but is found nowhere in such large quantities as in Spain and California. Almaden, in Spain, has long been famed for its mines of this metal, which, according to Bowles, are the richest in their produce, the most instructive as to the mode of working them, the

most curious for their natural history, and the most ancient in the world. We find them mentioned in Theophrastus 300 years before Christ, and Vitruvius also speaks of them. Pliny places Cisapona, or as it is sometimes written, Sisapona, in Bœtica, and says that this mine was kept sealed with the greatest care, and was only opened to take the quantity of cinnabar necessary for the consumption of Rome. (*Nat. Hist.*, xxiii., 7.) The Romans considered this mineral poisonous; but notwithstanding this their matrons painted their faces with it, and their painters employed it as a pigment. The Romans certainly worked this mine, but no traces remain of their labours. The Moors, owing perhaps to some prejudice, did not work it.

In the *Introduction à la Geografica Fisica y la Historia Natural de Espana*, we read that "the country about Almaden abounds in iron mines; and what is more surprising, in the same mine we find iron, mercury, and sulphur mixed, so as to form one mass. The neighbouring hills are formed of the same stone, and on all of them the same plants grow; from which we may infer that the mercury does not possess any poisonous quality, as is generally supposed, injurious to vegetation.

"The brothers Mark and Christopher Függer, of Germany, undertook to work this mine, and contracted to give the government 4500 quintals of mercury annually; but not being able to fulfil their promise, they abandoned it in 1635, together with the silver mine of Gualcanal, which they also had. While connected with these mines, however, their riches became proverbial in Spain, and their descendants live at present in Germany, with the rank of princes. A branch of this family afterwards took the mine, and worked it till 1645. In the following year the government undertook the management of it. Don Juan Bustamento established the furnaces, and also troughs for cooling the metal. These furnaces are twelve in number, and are called by the names of the twelve apostles. Each is capable of containing ten tons weight of ore. The furnace is kept burning for three days, and the same period is required for cooling."

Mr. Russell Bartlett, the United States Commissioner on the Mexican and United States Boundary Question, who visited California in 1853, gives the following account of the New Almaden Mine:—

"New Almaden consists exclusively of the buildings belonging to the company which owns the quicksilver mine. It embraces furnaces, storehouses, dwelling-houses for the officers and labourers, offices, mechanics' shops, &c. Many of them are of wood, but a large and fine range of substantial brick buildings is now in the process of erection, to take the place of the wooden ones. The novelty of the business of extracting the quicksilver from the cinnabar required a number of experiments, involving a very heavy expenditure; for there were few mines in the world where the operation was carried on on a large scale, and it could not be expected that a rival company like this, whose operations would effectually interfere with the trade the latter had for ages enjoyed, would be permitted to derive any information from their long experience. Machinery of various kinds was therefore imported from England and the United States at enormous cost, much of which has since been rejected, either on account of the great expense of running it, or its inadequacy to perform the service required. Six furnaces are now in operation reducing the ore, all of which seem to be alike, and of the most simple construction. The ore, when brought from the mine and deposited near the furnaces, is separated according to its quality. The larger masses are first broken up, and then all is piled up under sheds near the furnace doors. The ore is next heaped on the furnaces, and a steady, though not very strong fire is then applied. As the ore becomes heated the quicksilver is sublimed, and then being condensed, it falls by its own weight, and is conducted by pipes which lead along the bottom of the furnace to small pots or reservoirs imbedded in the earth, each containing from one to two gallons of the metal. The furnaces are kept going night and day, while large drops or minute streams of the pure metal are constantly trickling down into the receivers. From these it is carried to the storehouse, and deposited in large cast-iron tanks or vats. These are of various shapes and sizes, and are fixed in solid beds of stone and mortar. The largest, a square vat between four and five feet across, contained twenty tons of pure quicksilver. Seven or eight days are required to fill the furnaces, extract the quicksilver, and remove the residuum, the latter being the most dangerous part of the process. All is done as much in the open air as possible, the furnaces being merely protected by a roof.

"In the warehouse the metal is prepared for the market. This is done by

putting it into wrought iron flasks or bottles, holding about seventy-five pounds each. The quicksilver is dipped up with ladles, and poured into the bottles through an ordinary tin funnel. The opening or neck of the bottle is then stopped with a close-fitting screw, put in with a vice, so as to make it as tight as possible. These bottles, which weigh twenty-five pounds each, are all made in England, where they can be furnished much cheaper than in the United States. From the warehouse the metal is transported by ox-carts to tide-water about twenty miles distant, whence they are shipped to San Francisco. A shipment of a thousand bottles was lately made to Canton, by way of an experiment. In China it is chiefly used in the manufacture of vermilion and other articles of commerce. The quantity of quicksilver produced at New Almaden is about 100 bottles per month, or nearly 1,000,000 lbs. per annum.

"The mine whence the cinnabar is obtained contains veins of ore extending in every direction, sometimes horizontal, then perpendicular, and again at every inclination. Their whole extent now exceeds 7000 feet. When a vein is struck it is followed as far as it can be with safety, whatever may be its course. Some of the veins are five feet in diameter, others half that size. Some are also richer than others. In each of the veins is a single miner, for not more than one can work to advantage in these narrow recesses. Picks, drills, and crowbars are the tools employed.

"The miners, and those who merely handle the cinnabar, are not injured thereby; but those who work about the furnaces, and inhale the fumes of the metal, are seriously affected. Salivation is common, and the attendants on the furnaces are compelled to desist from their labour every three or four weeks, when a fresh set of hands is put on. The horses and mules are also salivated, and from twenty to thirty of them die every year from the effects of the mercury.

"This mine was long known to the Indians, who resorted hither for the vermilion which they could collect from the cinnabar. They had dug some thirty or forty feet into the mountain; but it does not appear ever to have been worked by the Spaniards. In recent times its commercial value was first discovered by Señor Castillero, who became its legal owner. Don José Castro, who subsequently became proprietor of it, sold his interest to Barron and Forbes, an English house doing business in Mexico. Another partner is Mr. Walkinshaw, an English gentleman, long resident in Mexico, and well skilled in mining. This gentleman now resides at New Almaden. Mr. Young is the superintendent of the mine, and Mr. Beston is the engineer.

"During the year 1853, the total exports of quicksilver from San Francisco amounted to 1,350,000 lbs., valued at 683,189 dollars. All this, together with the large amount used in California, was the product of the New Almaden mine. The following shows to what points the quicksilver was exported:—Hong Kong, 423,150 lbs.; Shanghae, 60,900 lbs.; Canton, 27,450 lbs.; Whampoa, 22,500 lbs.; Calcutta, 3,750 lbs.; Mazatlan, 210,825 lbs.; Mazatlan and San Blas, 19,125 lbs.; San Blas, 145,652 lbs.; Callao, 135,000 lbs.; Valparaiso, 148,275 lbs.; New York, 138,375 lbs.; Philadelphia, 75,000 lbs."

As the existence of an ore of cinnabar so rich in mercury, and found in such profuse abundance as that of New Almaden, appeared likely to have a material influence upon the permanent supply ordinarily found in commerce, a comparison was instituted between this and the ore derived from Old Almaden. The New Almaden ore has a bright red colour, slightly inclining to purple, and appeared to have been imperfectly cleared from a soft, light-brown earth, easily scraped from its surface. It breaks without much difficulty under the hammer, and is afterwards easily reduced to powder, with the exception of some bright crystalline particles, which are extremely hard. The surfaces of recently broken ore appear much more purple than those long exposed. It is traversed at irregular intervals by very thin bands of white, hard, crystalline material, apparently calcareous and silicious. When in the state of fine powder, it has a very brilliant vermilion colour, many shades darker than the massive ore. Its specific gravity is 4.410.

The specimen of ore examined from Old Almaden was obtained from Mr. Tennant, and described as one from which a considerable part of Spanish mercury was derived. It is like the Californian ore, massive, but much less brilliant and much harder. Throughout its mass, small patches of yellow iron pyrites are irregularly distributed. When in the state of fine powder, it has a dull brick-red colour, in striking contrast with the brilliant vermilion cinnabar of California. Its specific gravity is 3.622.

The mean of the analyses of three specimens of Californian ore gave as follows:—mercury, 69.90; sulphur, 11.29; iron, 1.23; lime, 1.40; alumina, 0.61; magnesia, 0.49; silicic acid, 14.41; loss, 0.67. The mean of two analyses of Spanish ore gave as follows:—mercury, 37.79; sulphur, 16.22; iron, 10.36; silicic acid and alumina, 35 12; loss, 0.51. These analyses were conducted by Mr. Adam Bealey, A.M., and are reported in the *Quarterly Journal* of the Chemical Society, vol. iv., p. 180. Mr. Bealey also analyzed two specimens of cinnabar, one from Moschellandsberg, and one from Wolfstein. The mean result obtained from the analyses of the Moschellandsberg ore, was, mercury, 66.86; sulphur, 11.43; insoluble residue, 17.09. The analysis of the Wolfstein ore gave, mercury, 18.00; insoluble residue, 73.31. From these numbers it is evident, that, provided the specimens represent the average minerals worked, the ore of California contains nearly double the amount of mercury found in the Almaden ore, and nearly fourfold that of the specimen of Wolfstein, whilst it approaches the composition of pure cinnabar even more nearly than the mineral of Moschellandsberg.

The other quicksilver mines worthy of notice are one at Huancavelica, in Peru; at Idria, in Carniola; in Hungary, Transylvania, and the district of Deux Ponts, in Germany. There is a mine of cinnabar near Alicante, and another not far from San Felipe, in Spain. Mercury has also been found in China and Japan; and though the amount of the produce is unknown, it is believed to be considerable.

According to Dumas, the following mines yield annually as follows:—Almaden, in Spain, from 2,700,000 to 3,456,000 lbs. avoirdupois; Idria, 648,000 to 1,080,000 lbs.; Hungary and Transylvania, 75,600 to 97,200 lbs.; Deux Ponts, 43,200 to 54,000 lbs.; Palatinate, 19,440 to 21,600 lbs.; Huancavelica, 324,000 lbs.

NOTE ON THE THERAPEUTIC ACTION OF THE SALTS OF CERIUM.

BY J. Y. SIMPSON, M.D.

The salts of few metals are at present in our Pharmacopœia, and Dr. S. saw no reason why many more might not be added to their number. He had recently drawn the attention of the profession to the salts of nickel, which, as far as his observation went, presented much similarity of action to those of iron and quinine, and seemed to be of use in cases of sick-headache. He now proposed to read to the Society some very important observations on the therapeutic action of some other metals; and first, as to cerium, which, given in the form of nitrate, and in one grain doses twice or thrice a-day, appeared to act as a sedative tonic of considerable value, strongly resembling bismuth and the salts of silver. He had employed it in the first instance in cases of general chronic intestinal eruption—a peculiar and intractable form of disease, for which arsenic and nitrate of silver were generally prescribed, and where these remedies had failed, cerium had been tried with marked advantage. In irritable dyspepsia, with gastrodynia and pyrosis, and in chronic vomiting, its exhibition was attended with satisfactory results; and in the vomiting which occurs during pregnancy prompt relief was afforded. It was a good tonic, and a useful substitute for the salts of silver, bismuth, and hydrocyanic acid. Dr. S. had not employed it much in convulsive diseases, as chorea and epilepsy, in which nitrate of silver was used, but the exhibition of the salts of cerium was certainly attended with this advantage, that it could be persevered in without any fear of discolouration of the skin. As far as his experiments with cadmium went, it bore much resemblance to the preparations of antimony, and excited diaphoresis and vomiting. Tellurium, besides its expense, was precluded from being used in practice by its disagreeable effects. Dr. S. mentioned the particulars of a case where a dose had been inadvertently given to a student of divinity, and had been followed by the evolution of such a persistent odour, that for the remainder of the session the patient had to sit apart from his fellow-students.

Dr. Gairdner (who occupied the chair during the reading of Dr. Simpson's communication), in the name of the Society, thanked Dr. S. for his very interesting paper. He (Dr. G.), however, felt doubtful how far a medical man was justified in experimenting with new remedies before their effects had been ascertained on some of the lower animals. This query he threw out merely in the way of suggestion, in the hope of hearing the views of Dr. Simpson and the other Members of the Society on this interesting subject.

Dr. Sellar said, that it was now a long time since the Pharmacopœia had received

any addition from the metals. Bismuth, he (Dr. S.) believed, was the latest, and he thought that the profession was indebted to Dr. Simpson for having opened up such a new and promising field of investigation. The question as to the propriety of instituting these experiments now ceased to exist, as the experiments had been successfully made, whether on inferior animals or not. He (Dr. S.) had little faith in bismuth or nickel, and as to tellurium, the less it was given the better.

Dr. Simpson thought he had been justified in carrying out these experiments, as, with the exception of arsenic, none of the metals were poisonous in smaller doses than half a grain, and, in the present instance, he had previously tried the remedies in similar doses on his own person. He might mention that the cost of cerium was one penny a grain, and that in London nitrate of silver was charged at the same price.—*Monthly Journal of Medical Science.*

ANALYSES OF BRINES FROM THE WORCESTERSHIRE SPRINGS.

Mr. A. B. Northcote* has examined two specimens of brine, one from Droitwich, the other from Stoke Prior. The qualitative examination showed that the only substances present in any estimable amount are, soda, lime, magnesia, chlorine, and sulphuric acid. The brine contains free carbonic acid, but as it issues from the delivery pipes in a foaming state, and the brine could not be taken from the pits, its estimation was impossible; bromine is likewise present in minute quantity, but iodine could not be detected in the mother-liquor from four pints of brine. Potash was detected in the mother-liquor from two pints of brine, but no evidence of lithia was obtained. The insoluble residues obtained after evaporation contained a trace of iron; phosphoric acid was recognized distinctly, but the search for fluorine, strontia, nitric acid, ammonia, antimony, tin, and arsenic, gave negative results. Sulphuretted hydrogen produced a decided brownish tinge in the brines acidified with hydrochloric acid, and the author supposes this reaction to be indicative of the presence of a minute quantity of chloride of silver in solution, since this metal has been found in rock salt;† he was, however, unable to obtain an experimental confirmation of his opinion.

The physical characters of the brine and the direct results of the analyses were as follows:—

	DROITWICH BRINE.		STOKE BRINE.
	January, 1854.	August, 1854.	August, 1854.
Specific gravity	1.1893	1.1792	1.2044
Temp. of air	"	76°.5 F.	75° F.
Temp. of brine	"	54°.5 F.	55° F.
Reaction	"	slightly alkaline.	slightly alkaline.

Table of direct Result of Analysis calculated to 100 *parts.*

	DROITWICH BRINE.						STOKE BRINE.		
	January.			August.			August.		
	I.	II.	Mean.	I.	II.	Mean.	I.	II.	Mean.
Potassa	...	...	...	...	...	trace	...	...	trace
Soda	12.5798	12.5929	12.5864	12.1501	12 1217	12.1359	13.7804	13.7754	13.779
Lime	.1508	.1530	.1519	.1581	.1612	.1596	.1102	.1049	.1075
Magnesia	.0196	.0204	.0200	.0167	.0159	.0163	.0187	.0143	.0165
Sesquioxide of iron	...	...	trace	...	...	trace	...	...	trace
Chlorine	14.1344	14.1360	14.1352	13.6167	13.6329	13.6248	15.4479	15.4916	15.4697
Bromine	...	...	trace	...	...	trace	...	...	trace
Sulphuric acid	.4256	.4269	.4262	.4886	.4876	.4881	.4896	.4880	.4888
Phosphoric acid	...	...	...	...	...	trace	...	...	trace
Silicic acid	...	...	trace	...	...	trace	...	...	trace
Residue on direct evaporation	24.2272	24.1856	24.2064	23.4205	23.4205	23.4205	26.4632	26.4866	26.4749

* *Philosophical Magazine*, January, 1855.

† *Annales de Chimie et de Physique*, 3rd Series, xxviii., 129.

The author has calculated the whole of the lime as sulphate, upon the assumption that the gypsum, which is an invariable ingredient of rock salt, dissolves as such in the brine, although the quantity is greater than would be dissolved by water in the absence of the other salts.

Table of Constituents calculated in 100 *parts.*

	DROITWICH BRINE.		STOKE BRINE.
	January.	August.	August.
Chloride of sodium	23.2932	22.4521	25.4923
Bromide of sodium	trace	trace	trace
Sulphate of potassa	...	trace	trace
Sulphate of soda	.3712	.3095	.5948
Sulphate of lime	.3690	.3878	.2612
Carbonate of soda	.1382	.1157	.0161
Carbonate of magnesia	.0420	.0349	.0347
Phosphate of lime	...	trace	trace
Phosphate of sesquioxide of iron ...	...	trace	trace
Silica	trace	trace	trace
	24.2136	23.3804	26.3991
Solid residue by direct evaporation	24.2064	23.4205	26.4749

Table of Constituents calculated to the gallon.

	DROITWICH BRINE.				STOKE BRINE.
	Horner.	Daubeny.	January 1854	August 1854.	August 1854.
Chloride of sodium	21585.5	16910	19392.570	18532.886	21492.048
Chloride of magnesium	16.8				
Sulphate of soda	407.0	402.5	309.097	322.334	501.539
Sulphate of lime	363.7	.....	307.282	320.113	220.246
Carbonate of soda	.....	.....	115.123	95.519	13.573
Carbonate of magnesia	.....	.....	33.501	28.353	29.263
Solid contents	.....	17460			
Total	22373.0	.....	20157.573	19299.205	22256.669

The latter table contains results obtained by Dr. Daubeny in 1830,* and by Mr. Horner in 1812,† by the examination of Droitwich brine. The brine analyzed by Mr. Horner corresponds more nearly with that from Stoke, but at that time no shafts had been sunk at Stoke, a circumstance which might materially influence the neighbouring springs. He found the specific gravity of the different specimens to vary from 1.20611 to 1.17471, and the temperature to be 55° F., very near that observed by the author.

The saliferous strata of the New Red Sandstone lie both in Cheshire and Worcestershire, in a basin of Lias. At Northwich, in Cheshire, masses of rock-salt exist, sixty feet in thickness, 1400 yards in breadth, and a mile and a half long; and from a bed still lower, salt has already been removed to a depth of 110 feet. In Worcestershire the deposits, although large, do not appear to be on so gigantic a scale; the whole depth of the rocks constituting the matrix has been estimated at upwards of 600 feet; and from some observations published by Sir Charles Hastings some years

* *Transactions of the Royal Society for* 1830.
† *Geological Transactions*, Old Series, vol. ii., page 94.

since, on the sections disclosed by the sinkings at Stoke Prior, the layers of salt in this region vary from mere veins to deposits of more than thirty feet in thickness.*

The brine-springs of Droitwich are stated by Sir C. Hastings to have been in use in the time of the Romans; but the existence of deposits of rock-salt does not appear to have been suspected until about thirty years ago, when a person acquainted with the features of the salt district of Cheshire, upon examining the geological peculiarities of the marls at Stoke Prior, a place nearly four miles to the N.E. of Droitwich, gave it as his opinion that rock-salt would be found there in sufficient quantity to make the working profitable. Shafts were accordingly sunk, and both salt and brine found. Of the latter they speedily availed themselves, but rock-salt has not at any period been quarried, as in Cheshire; probably the extent of the deposits found on sinking the shafts did not warrant such an undertaking, or perhaps the abundance of the issuing salt-spring presented a more immediately available and less expensive source of the desired substance. At both places (Stoke and Droitwich) a shaft of considerable diameter is sunk and lined with an iron casing; in this the pumps which remove the brine and convey it to the reservoirs are fitted, and from the bottom of this upper tube a narrower pipe is carried down to a considerable depth, until, in fact, it reaches the subterranean brine chamber. The depth of the iron casing at Droitwich is 150 feet, that of the boring below, twenty-five feet; and so abundant is the supply of brine, that if the pumps cease working, the shaft is speedily filled to within nine feet of the surface. At Stoke the supply appears now to be equally inexhaustible, although in former years it failed; but the present proprietor has bored deeper than his predecessors, and has, by means of a shaft 225 feet deep, and a boring of 348 feet more, succeeded in breaking through the drier and more superficial deposits, and has no doubt penetrated a larger and better supplied reservoir than had previously been opened.

The brine, thus pumped out of the pits as fast as it is supplied, is treated at both places in a precisely similar manner; it is conveyed by pipes directly from the pumps into large but shallow reservoirs, which act as feeders to the numerous pans in which the evaporation is carried on. These pans vary in length from sixty to 100 feet, and are about twenty feet broad, and eighteen inches deep. The evaporation is conducted rather rapidly in the manufacture of ordinary salt, to prevent its deposition in crystals of too large a size; in the case of bay-salt, the crystallization is allowed to be slower; in the large pans, however, such is the difference of temperature in different parts of the pan, from the furnace being placed at one end, that while the fine-grained salt is produced at the hottest end, bay-salt is the result of the diminished temperature at the other. The salt as it crystallizes out sinks to the bottom, and is continually removed by the workmen, who place it in tall boxes having their bottoms pierced; in these the salt is allowed to drain and settle, and is shortly afterwards removed in the form of a consolidated block and placed in the drying-room. The fine salt, which is not sent to the market in blocks, is drained and dried in conical wicker baskets, from which it is easily shaken out as a rough powder, whilst the bay-salt is merely removed from the pans by the shovel.

Formerly the brine reservoir beneath Droitwich was drawn upon in several places, each proprietor sinking a shaft for himself; but by degrees these shafts have all, with one exception, fallen into the hands of a single firm, that of Messrs. Clay and Newman, who finding the supply afforded by one shaft quite sufficient for their purpose, have discontinued working the others.

In a paper of Dr. Holland's, on the deposits of rock-salt in Cheshire,† he states that the beds in that county have their longitudinal extension in a line drawn from the N.E. to the S.W., and that their greatest thickness is at the N.E. extremity, from whence they thin out as they approach the S.W. In reference to this circumstance the author observes: "From what is known of the deposits in Worcestershire, it would appear that they also follow somewhat of the same method of arrangement. Stoke and Droitwich stand to each other in the relation of N.E. to S.W.; and from the fact of brine being found at both points, and that of very similar composition, there can be little doubt of a continuity of the strata from which it is produced between the two places; at the same time, the possibility of the extension of the rock-salt is, at least on one side, confined to that direction,

* *Murchison's Silurian System*, vol. i., p. 31.
† *Geological Transactions*, Old Series, vol. i., p. 46.

sinee at Forest Hill, near Hanbury,* a place about two miles south of a line joining Stoke and Droitwich, outcroppings of Lias are found, which, as they indicate the termination of the new red sandstone, show also of necessity that of the rock-salt. Whether as great a similarity exists between these two great English deposits in their shape as in their direction, cannot so readily be inferred, since it is of course doubtful whether at either of the explored parts the lowest limit of the salt has been reached ; yet since the level of the ground at Stoke is from 300 to 400 feet higher than that at Droitwich, and the productive salt deposits there do not appear to begin until the borings have been sunk to about the level of the former place, it would seem that in the Worcestershire salt beds no such thinning out in a south-westerly direction takes place.

"These brines doubtless spring from large subterranean reservoirs, produeed probably in the first instance by the solvent action exerted on the rock-salt by spring or rain-water. That this is so at Droitwich is clear from what Mr. Horner states as having oecurred on the first sinking of a shaft at that place ; he says, that after penetrating for 150 feet, the borer suddenly descended 22 inches ;† the roof of the brine chamber had evidently been broken through, and the water instantly burst into the tube and gushed from the aperture with great force. This account is confirmed by observations of the same kind made at Stoke Prior; but owing to the greater elevation of the land, the brine when 'tapped' rose only to within 90 feet of the surface, but its ascension in this case also was very rapid. The idea of extensive cavities filled with brine, existing beneath these places, also receives additional support from the distinct sinking of the ground around the salt-works at Droitwich; at that place, *i. e.*, at which the subterranean reservoir would be nearer the surfaee, and where consequently the intervening strata would present a lesser obstacle to the filling up by a more solid material of the space rendered vacuous by the removal of the brine. We can readily conceive the incessant action of the pumps to gain in the course of years upon the supply by which the chamber is replenished, and an occurrence of this sort is exactly that which might have been predicted.

"It is thought by persons on the spot, that a stream of brine passes from Stoke to Droitwich, and is at once the source from which the supply at both places is derived; and although at first this might appear most probable, when we remember that (taking into consideration the difference in the level of the localities) the same depth has to be reached before the brine can be obtained, yet I cannot but think that one circumstance tends to show that this view is not the correct one; for if such were the case, the brine should in each instanee rise to the same level in the different shafts when left undisturbed by the action of the pumps. Now under these conditions, the height to which it ascends at Droitwich is about 166 feet, whilst at Stoke, starting from very nearly the same level, the column of water rises to a height of 483 feet: this of itself is sufficient to show that no direct communication can take plaee between these two springs without supposing a violation of one of the first principles of hydrostatics. It might then be thought that a reference to the analyses before given might decide this question, but on comparing the constituents of the two waters, we can easily see that, taken alone, they prove nothing, since the differences are such as might readily be found in the same water when passing over slightly differing deposits. If the stream ran from Stoke to Droitwich, we might suppose that in its course it met with strata containing more sulphate of lime than it had as yet encountered, and at the same time was somewhat diluted with streams poorer in chloride of sodium; but I rather incline to think, that even from the composition of the brines, there is no reason to suppose that such a direct communication exists; their great similarity may easily be accounted for by supposing an equal similarity in the composition of the entire strata of rock-salt from which they are derived. Numerous fresh-water streams occur in the higher parts of these deposits, in fact, no less than three are encountered, and have to be guarded against in the Stoke shafts, and these, doubtless fed by rain-water, permeate the strata in various directions, and dissolve the rock-salt with which they come in contact. Mr. Corbett informs me that the salt from which his brine is drawn is perfectly transparent, which clearly accounts for the fact of the Stoke brine containing less sulphate of

* *Murchison's Silurian System*, vol. i., p. 32.
† *Geological Transactions*, Old Series, vol. ii.

lime, while the somewhat diminished strength of the Droitwich brine is probably due to the less perfect exclusion of the fresh-water springs of the upper strata from the shaft which reaches the reservoir. Their striking similarity in other respects, the identity of their temperature, and of the traces of substances which they contain, point to an identity also in the composition of the deposit from which they are formed, of the solvent which renders them available, and of the manner in which they are produced."

EXAMINATION OF TWO SPECIMENS OF NATIVE PARAFFIN.*

The substance to which this name was applied by Reichenbach, was obtained by him from a great variety of organic substances, among others, from coal. Since that time substances analogous to paraffin have been found native in Moldavia, Galicia, Lower Austria, France, England, &c., and to these the names mineral wax, ozokerite, or mineral paraffin have been given. Attention was first directed to these substances in 1833, by Mayer, at a scientific meeting at Breslau. The substance referred to by him was from Slanik. The name of ozokerite, or mineral wax, was first applied to it by Glocker. A specimen of it was examined by Magnus, who found it identical in composition with olefiant gas and with paraffin; but he was of opinion that, notwithstanding its apparent homogenity, it was a mixture of several substances. Schrötter examined the same substance, and found its composition the same as Magnus had done. He gave as the melting point 143° F., the boiling point 430° F., and the specific gravity 0.953.

Malagati examined ozokerite from Zietrisika; he found its composition identical with that of olefiant gas, and separated it, by solution in alcohol, into portions with melting points varying from 167° to 194° F., and specific gravities from 0.845 to 0.957. He remarked that nitric acid acted upon the substance with evolution of red vapour, but that it appeared not to experience any material alteration. He considered it to be a mixture of substances unequally soluble in alcohol, identical in composition with paraffin, but different from it. Laurent examined a similar substance from the bituminous shale of Autun; it had a melting point of 151° F. Walter examined mineral wax from Trouskawiez (Galicia); it melted at 138° F., boiled at 572° F., and had the same composition as the substances already mentioned. He considered it to be true paraffin.

The crystallizable native substances, known by the names of scheererit, hartit, idrialite, hatchetine, middlelonite, &c., are of different chemical nature from the above, since they have not only characters different from paraffin, but likewise a different composition.

Hofstädter has recently examined, at the instigation of Reichenbach, two specimens of paraffin of mineral origin.

One is obtained on a large scale in the neighbourhood of Bonn, together with liquid oils, by the distillation of bituminous shale. He received it in the raw state as it is obtained by pressure, solution in sulphuric acid and precipitation by water; it was crystalline, and with characters analogous to paraffin had a melting point of 131° F.

The other specimen was from Borystow (Galicia). Its occurrence is described by Doms, from whom he obtained it, as follows:—"Thick masses of clay, loaded with bitumen—a solution of ozokerite, paraffin, pyroligneous resins, and asphalt, in mineral naphtha—occur frequently in proximity to the salt formation at the border of the Carpathians. To obtain this bitumen a pit was sunk, in the hope of meeting with conditions like those of Baku on the Caspian. The bituminous clay is reached at a very small depth, and for seven or eight fathoms down is saturated with bitumen; below this the ozokerite occurs alone, in balls imbedded in the clay, so that from two-thirds of a cubic fathom of earth 220 pounds of crude ozokerite was obtained by heat. At a still greater depth the clay is less bituminous, but it is upwards of sixteen fathoms thick." The substance, as received by the author, was somewhat softer than wax, of a dark brown colour, transparent in thin pieces, and feebly dichromatic (red and green); it had a distinct odour of naphtha, no taste, a specific gravity of 0.944 at 77° F., and melted at 140° F.

The examination of these two specimens was made comparatively with paraffin,

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* *Annalen der Chemie und Pharmacie*, September, 1854.

prepared by Reichenbach, from beechwood. Its melting point was 117°.5 F., and the specific gravity 0.862. The solution in boiling alcohol deposited, on cooling, a considerable quantity in a crystalline state. By aid of the microscope three different kinds of crystals could be distinctly recognized as stated by Reichenbach in his original memoir. These were felt-like needles, pearly scales and angular granules. By gradual crystallization from alcohol the substance was separable into portions, having different melting points. The most soluble portion melted at 117° F. The least soluble at 118°.5 F. Hence it appears to consist of several isomeric hydrocarbons.

The substances from Bonn and from Galicia were examined in the same manner. Both were perfectly soluble in a sufficient quantity of alcohol, and separated from the solution on cooling, in the same manner as the paraffin, and presented the same crystalline forms. Both were separable by fractional crystallization into portions having different melting points. Analysis showed the elementary composition of both to be identical with that of olefiant gas.

	Substance from		Other analyses by			
	Bonn.	Galicia.	Magnus.	Schrötter.	Malaguti.	Walter.
C	86.16	84.94 ..... 85.75	85.75	86.20	85.8 ..... 86.2	85.85
H	14.36	14.87 ..... 14.29	15.15	13.79	13.7 ..... 14.1	14.28

By treating the paraffin from beechwood with nitric acid it yielded succinic, valerianic, and butyric acids, and the same result was obtained with the substances from Bonn and from Galicia.

PHARMACY IN THE CRIMEA.

The daily complaints of the want of supplies and comforts in the Crimea, apply to Pharmacy in common with other departments. Many letters have lately appeared in the newspapers complaining of the want of medicines, and the defective manner in which the hospitals are provided with assistance. A Surgeon writes to say that he has above 100 men suffering from diarrhœa, and on applying to head quarters for opium, he receives half an ounce. Others can get none, although Turkey is the locality whence the chief supply of opium is obtained.

The want of assistants to dispense medicines, is, we believe, equally felt. We have been told that this office is performed in some cases by the corporals or serjeants of the regiments, the medical officers being over-worked.

This latter deficiency need not long exist, as there are many candidates for the office of dispenser to the hospitals. These arrangements are under the controul of the Army Medical Board, St. James's Place, London, of whom Dr. Andrew Smith is the official organ of communication. We were lately informed that upwards of 200 young men had applied for situations as dispensers, in addition to those already appointed. This office was not formerly recognized in the army, the dispensing of medicines being usually comprised in the duties of the Surgeon, but we see no reason why the division of labour should not be carried out in the army as well as in the civil department.

EARLY CLOSING.

At a General Meeting of the Chemists and Druggists of Derby, convened for the purpose of taking into consideration the request of their Assistants and Apprentices to abridge the hours of business—to allow them more time for relaxation and improvement—the request being accompanied by a pledge that such privilege should not be abused or intended to interfere with the domestic arrangements of their principals,

Resolved,—That the following notice be published in the Derby Papers and by handbills:—

"At a General Meeting of the Chemists and Druggists of Derby, held, by the kind permission of the Mayor, in the Grand Jury Room, on Thursday, the 11th of January, 1855, the following resolutions were passed:—

"The Chemists and Druggists of Derby respectfully inform the public, that after Monday, Feb. 5th, 1855, their shops will be closed during the whole of the Sunday, and every night during the week at eight o'clock, except Saturday until ten o'clock;

that no articles will be supplied during such time as the shops are closed, except medicines of necessity and dispensing prescriptions. They beg to state they have come to this mutual arrangement to give more time to those in their employ for improvement and relaxation, and they most earnestly solicit the public to enable them to carry this measure out, by sending for such articles as may be required during the hours of business.

"*Resolved*,—That the closing of the shops shall be understood to mean the putting up the shutters, closing the doors, and extinguishing the lights.

"We, the undersigned, pledge ourselves strictly and honourably to fulfil these our engagements.—As witness our hands, January 11th, 1855.

"Thomas W. Walton	Edward Hart	Philip Brookes
Joseph Dawson	Joseph Bloor	Thomas Salt
Frederick Parker	W. B. Sherwin	Richard Stephenson
Henry Goodall	George A. Hewitt	William Kirk
William Platts*	William Harvey	Frederick Joseph Ison
Bryan Barnes	William Rutherford	Thomas Goodwin
Wm. Lloyd Poundall	Wm. Sandars Hunt	Henry Flower and Son."

The following notice has been circulated at St. John's Wood:—

"The Chemists and Druggists of St. John's Wood, viewing the custom of late business hours as detrimental to health, respectfully give notice to their customers, and the inhabitants generally, that, on and after the 1st January, 1855, they will close their establishments punctually at half-past nine o'clock, P.M., except on Saturdays, when the hour will be ten; and finally, on and after the 1st April, at nine o'clock. Medicines, &c., will of course, if required, be supplied at a later hour, and, as hitherto, at any time throughout the night."

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I desire to say a few words on the subject of Early Closing, and shall feel obliged if you will give me the opportunity. In a country town like this, I think there can be no reason why the hour of closing should be extended past eight, as there are few cases of emergency which occur after that hour. I have paid particular attention to the wants of late customers, and find that not one person in a hundred who comes to my shop after that hour has any real necessity for so doing. The only reason I can see for late hours is the desire to catch stray customers, and in a small city like this, where we have the enormous number of twenty-three Chemists and Druggists, such a state of things is only natural. There seems to me to be no difficulty in the way of effecting an alteration, if the Early Closing Association in London would issue a circular to the Local Secretary of the Pharmaceutical Society in every town, suggesting the desirability of calling a meeting of the trade to consider the subject, and to all the members of the Society in the place desiring their co-operation. If one or two opposed the movement at first, they would in all probability yield to the wishes of the majority, and a good result would follow. As this would entail serious expense on the Early Closing Association, I would suggest that each meeting should be requested, through the Local Secretary, to raise a subscription for their fund. As to yourself, Sir, I feel convinced you will be found ready to assist one of the most over-worked and ill-paid classes of people in the world.

I am, Sir, your obedient servant,

Lincoln, Jan. 6th, 1854. A Labourer of Fifteen Hours a-Day.

P.S. I enclose my card.

[With one exception, we recommend the suggestions of our correspondent for consideration. We cannot, however, see any advantage in calling in the aid of another Association, the Pharmaceutical Society being organized and fully capable of carrying out all that is required. It is the duty of the Local Secretary in each town to attend to suggestions from the Members, and to call meetings when occasion requires.—Ed.]

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* Mr. W. Platts, St. Peter's Street, has since withdrawn his engagement. Messrs. Hollingworth and Hollis, Queen Street, and Mr. Jno. Marshall, Rotten Row, do not accede to the arrangement.

BOOKS RECEIVED.

The Literary and Scientific Register and Almanack, for 1855. By J. W. G. Gutch, M.R.C.S.L. London: David Bogue, 86, Fleet Street.

Contains, in addition to its usual large amount of information, a brief outline of Photography, with practical directions, which will be found useful to our readers, now the art is so generally practised.

On the Mode of Communication of Cholera. By John Snow, M.D., &c. Second Edition, much enlarged. London: John Churchill, New Burlington Street. 8vo, pp. 162. From the Author.

The London and Provincial Medical Directory. 1855. London: John Churchill, New Burlington Street.

The Half-Yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., Cantab., and C. B. Radcliffe, M.D., Lond.; L.R.C.P., &c. Vol. xx., July—December, 1854. London: John Churchill. Edinburgh: Maclachlan and Co. Dublin: Fannin and Co. 1855.

TO CORRESPONDENTS.

W. I. (Dublin).—(1.) Black oxide of copper may be made by heating to redness the nitrate, which suffers decomposition. (2.) Fownes's *Manual of Chemistry.*

Delta (Cheltenham) has sent a sample of Pil. Ferri. Comp. made by substituting carbonate of potash for carbonate of soda, using rather less of the former, owing to its greater solubility; omitting the treacle and adding a similar weight of brown sugar: this forms a good mass, which does not become hard. Delta suggests this as an improvement in the process for the consideration of the Pharmacopœia Committee.

An Associate.—(1.) Gum tragacanth.—(2.) Candidates for admission into the Chemical Society are required to produce certificates of recommendation, after which the election is decided by ballot.

An Associate (Rochdale) and another Correspondent recommend a Ball for the benefit of the Benevolent Fund. We shall revert to the subject next month.

S. P. C. (Stoke-upon-Trent).—(1.) *Syrup of Tolu,* if made according to the Pharmacopœia, is clear.—(2.) *Inks.* See vol. xii., pp. 65 and 133.

A Subscriber (Deptford).—*Sulphuric Acid Chambers.* The information required may be obtained on application to Messrs. Pontifex and Wood, Shoe Lane.

W. B. S. (Stonehouse).—The work referred to ("Robinson *on the Teeth*") is published by Webster, 60, Piccadilly.

W. S. (Birmingham).—*Black varnish for leather.* Boil together 1 gallon of boiled linseed oil, 8 oz. of umber, and 3 oz. of asphaltum. When sufficiently cool, thin it with oil of turpentine. See Beasley's *Druggists' Receipt Book.*

F. A. C. (Rochdale).—Cyanide of potassium.

J. R. P. C.—The difficulty in getting the iron alum in crystals probably arose from the sulphate of iron not being completely peroxidized. It would be better to use nitric acid in excess, and afterwards drive off the excess by evaporating the salt to dryness.

S. H. (Birmingham).—(1.) No. (2.) The natural order.

A. B. (Newton).—Syrupus Ferri Superphosph., vol. xii, page 311.

Mr. Kirkham.—No name was mentioned.

Mr. Collins' communication arrived too late for this month.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. IX.—MARCH 1st, 1855.

THE JUDGMENT IN THE COURT OF QUEEN'S BENCH, AND ITS INFLUENCE ON THE PROSPECTS OF THE PHARMACEUTICAL SOCIETY.

The judgment, which we published entire in our last number, as pronounced by Lord Campbell in the Court of Queen's Bench, is so clear and positive that it required no comment. It has been received by the Members of the Society with much satisfaction, as a final settlement of the questions in dispute. The learned judges have skilfully sifted the evidence, and separated the "wheat" from the "chaff." Disregarding the heavy mass of irrelevant matter which was entangled with the argument, they have seized upon all the important points, and explained them *seriatim* in a manner which proves that they completely understood the subject in all its bearings. If Lord Campbell had attended every sitting of the Select Committee of the House of Commons, which settled the clauses of the Pharmacy Bill, his Lordship could not have expressed more accurately, emphatically, and concisely the intentions of that Committee in regard to its provisions, and the general interpretation of the Act as ultimately passed by the Legislature. It is also satisfactory to find that the principle upon which the Council have acted, in the exercise of the discretionary power vested in them, is precisely in accordance with the principle laid down by Lord Campbell in the Court of Queen's Bench.

During the period which intervened between the application for a rule *nisi* and the judgment delivered by the Court, the business and proceedings of the Society were partially suspended. Many Members who had been elected under the new Bye-laws failed to take up their membership. Others delayed the renewal of their subscriptions to the Society under the influence of the prevailing suspense. The stimulus which the passing of the Act had given to the School of Pharmacy had been succeeded by comparative inertia, in the absence of a direct motive for going through the labour of qualifying for admission into a Society the tenure of which was uncertain. While this cloud obscured the horizon of the Society the Council were of course obliged to suspend any proceedings which they might otherwise have taken to enforce the provisions of the Act, which for the time being had become almost a "dead letter."

Immediately upon the publication of the decision of the Court, symptoms of renewed activity were manifest. The subscriptions of doubting Members began to come in, and numerous inquiries respecting the terms and conditions of admission denoted an increasing desire to join the Society. The School of Pharmacy exhibited signs of fresh vigour, and the number of Students at the present time is larger than it was during any part of the last season. The Board of Examiners, after a period of comparative leisure, are again called into requisition by a larger list of candidates than they have had for several months.

Such are the results which were to be anticipated on the extrication of the Society from the annoyance of litigation and the depressing influence of doubt, and no sooner was the decision of the Court of Queen's Bench circulated among the Members, than it became evident that the Society had received a fresh impulse. We felt that any expression of exultation over a defeated opponent would be unseemly and in bad taste, but with a desire to throw the past into the shade, and to promote a complete restoration of harmony in the future proceedings of the Society, we revived the proposal for a dinner on behalf of the Benevolent Fund. The general approval with which this proposal was received by those Members with whom we have had any communication on the subject, led us to anticipate an early and very pleasing celebration of the renewed

prosperity of the Society and the progress of Pharmaceutical education, combining benevolence to the unfortunate with good fellowship among the Members of the Society.

The day, however, is not yet fixed, as it appears that one individual is not satisfied with the judgment, and we understand that he has given notice of an appeal to a Court of Error.

After the unequivocal and unanimous decision of the four learned Judges in the Court of Queen's Bench, we have nothing to fear from this factious proceeding; and have only to regret the delay which it will occasion in the full development of the powers vested in the Society by the Legislature under the Pharmacy Act.

THE PHARMACOPŒIA COMMITTEE.

(THE MATERIA MEDICA.)

The list of the Materia Medica prepared by the Pharmacopœia Committee is now printed, and will be circulated to the local Secretaries with this number of the Pharmaceutical Journal. It comprises all the materials contained in the three Pharmacopœias of England, Scotland, and Ireland. In the compilation of the list the Committee have been much assisted by reference to Mr. Squire's Pharmacopœia, which embodies all the substances and preparations of the three Colleges, classified and arranged alphabetically, with concise notes.

The list about to be circulated does not contain the formulæ, but is simply a list of Materia Medica, including the names of the preparations, which are printed in a form similar to a table of contents, showing at a glance the discrepancies between the three Pharmacopœias and the instances in which they coincide, so far as relates to the substances, the compounds, and the nomenclature.

The object for which this list is issued, is to obtain information from various sources and localities in reply to the questions appended to it, which are also inserted in the Transactions of the Society for the present month, page 395.

It is not considered necessary to send the list to every Member of the Society, as it is probable that a majority might not be disposed to undertake the revision and to furnish replies. But it has been arranged that copies are to be sent to the local Secretaries for distribution among those Members who may be interested in the subject and inclined to assist. Any Member desiring a copy may obtain the same on application to the local Secretary, who will be supplied, according to the demand, by the Secretary in London.

This portion of the Pharmacopœia, although probably less generally interesting than some other parts of the work, is very important, comprising as it does all the materials employed, which form the groundwork of the Pharmacopœia. Before entering into the details it is desirable to make the list complete—to add any useful drugs or medicines which may have been overlooked, to erase such as may have become obsolete and useless, and to correct any errors in nomenclature or discrepancies between the three Pharmacopœias. The ultimate object in view is to bring about an amalgamation and a national Pharmacopœia; and although this project is not yet officially under the consideration of the Pharmacopœia Committee, we are sanguine in the belief that such will be the result of the present undertaking. The comparative analysis to which the Committee are subjecting the three Pharmacopœias, will bring to light in a tangible form all the incongruities between them, from which arise so much danger to patients and inconvenience to dispensers. When the defects are thus clearly pointed out the remedy will be comparatively easy, and its necessity will become still more manifest.

The existing evil is not confined to our own country, but extends to America, where the British Colleges would be respected as an authority in Pharmacology, if they were not stultified by gratuitous and unnecessary differences among themselves, as forcibly pointed out in the subjoined remarks by Dr. Bache.

ON THE ADVANTAGES THAT WOULD ACCRUE TO ENGLISH AND AMERICAN PHARMACY BY THE ADOPTION OF A SINGLE UNIFORM PHARMACOPŒIA FOR THE BRITISH EMPIRE.*

BY FRANKLIN BACHE, M.D.,
Professor of Chemistry in Jefferson Medical College of Philadelphia.

A DIFFICULTY which medical students have to contend with, and which is the more to be regretted, because it does not necessarily attach to science, is to be found in the numerous synonyms in use in the various sciences connected with medicine. We have them in Botany, in Chemistry, in the Materia Medica, and especially in the nomenclature of pharmaceutical preparations. The Pharmacy of this country, before the year 1820, when our first national Pharmacopœia was published, was derived from Great Britain, which furnished us with three standards of pharmaceutical preparations; namely, the London, Edinburgh, and Dublin Pharmacopœias, emanating from the Colleges of Physicians of those cities. In that year our national Pharmacopœia came into use as a standard; and by its several revisions in 1830, 1840, and 1850, it has been rendered more and more acceptable to the medical and pharmaceutical professions. Still, our national work could not be expected entirely to supersede the British Pharmacopœias; and, accordingly, it will be found that all the Dispensatories published in this country since 1820 have not only elucidated the United States Pharmacopœia, but included a commentary on the British works. The course thus taken by commentators was a proper one. Our national Pharmacopœia could not be expected to include the whole of the Materia Medica and preparations of the British standards, a part of the matter of the three works being peculiar to each; and yet the articles omitted deserved to be commented on by our Pharmacologists, either on account of their lingering reputation, or in view of their being frequently referred to in valuable medical works of English, Scotch, and Irish authors. So long, therefore, as we give the attention to the medical literature of Great Britain that it deserves, we must make ourselves acquainted with the officinal medicines and preparations, stamped as of value by the authority of her Colleges; otherwise her medical writers would be, to some extent, unintelligible to us. It is thus clearly shown that we are necessarily interested in British pharmacology, and in those meliorations of which it is undoubtedly susceptible. But the pharmacology of Great Britain is mainly embodied in her three Pharmacopœias, each emanating from an authoritative body; while, evidently, there should be but one standard for the whole British empire. The evil of this want of uniformity is put in a striking point of view, by supposing that each State of our Union had a separate Pharmacopœia; but the evil is the same in kind, only less in degree, that a separate Pharmacopœia is recognised, severally, in England, Scotland, and Ireland.

By the more enlightened nations of continental Europe, the interests connected with the preparation of medicines are better guarded; as in France, for example, where but one standard of pharmacy is allowable by law for the whole empire; and this standard is the result of the joint labours of a commission of Physicians and Pharmaceutists, appointed by the government. The evil of the British system is admitted by British medical writers; and the reform is delayed, not because it is deemed unnecessary, but because the Colleges cannot agree upon a single standard, chiefly on account of their local prejudices and mutual jealousies. The British Pharmacopœias contain a body of identical or equivalent medicines and preparations, which form the common basis of the three works. In relation to these medicines and preparations, it would be necessary to agree upon a uniform nomenclature, and upon uniform formulæ. This agreement being effected, it would next be a question in relation to the medicines and preparations peculiar to any two or any one of the Colleges; and the nomenclature and formulæ of these should be made to conform in principle with those of the common basis. No College could reasonably object to the retention of any medicine or preparation, advocated by any other College; because, arthough the article may be uncalled for in the region under the influence of the objecting College, still it would be merely surplusage to such College; while it might be necessary to meet the wants of the Physicians in the region under the influence of the advocating College. The prejudices and conflicting in-

* Extracted from an unpublished introductory lecture, delivered Oct. 12, 1854.

terests, shadowed forth in these remarks, would make it extremely difficult not to say impossible, to get the British Colleges to agree on all points in relation to a common standard. The most that could be expected from them, would be to settle the general principles of the work, and to take some steps of detail in the right direction. To make a final disposition of the subject, it would, no doubt, be necessary that the law should interpose; and that, by authority of an Act of Parliament, a commission of eminent men should be clothed with full power to dispose of all outstanding questions, and to complete the desired standard. If a course somewhat like that here indicated were taken, the advantage would accrue to medical science of having not merely one, instead of three British Pharmacopœias, but of having the elaborated work incomparably superior to those it would supersede. Many anomalies and inconsistencies of British Pharmacy would disappear; dangerous variations in the strength of officinal solutions of the salts of morphia would no longer exist; and those glaring defects in nomenclature, consisting in calling the same preparation by different names, and different preparations by the same name, would be removed. Our national Pharmacopœia would be benefited by such a reform; for, without doubt, if such a Pharmacopœia of the British empire were published, all the new and valuable parts of it would be incorporated into our national standard on its next revision in 1860. Nor is this all. Our Physicians and medical students would feel the benefit of the reform. British medical works would employ a uniform nomenclature for medicines; and our Dispensatories would be relieved from a number of discordant formulas, and from a load of useless synonyms, which at present form a most discouraging obstruction to the progress of the student.—*American Journal of Pharmacy.*

THE EQUILIBRIUM BETWEEN SCIENCE AND TRADE.

For more than fourteen years we have been endeavouring to reconcile and unite functions which were formerly considered almost incompatible—namely, the abstruse science of the Chemist and the practical trade of the Druggist. The proposition to introduce scientific pursuits as an essential element in the education of a Chemist and Druggist was, in the first instance, considered an innovation. By many persons the necessity for such qualification was scarcely admitted, and by some it was declared to be an injudicious proceeding, likely to divert young men from practical business habits.

By degrees these prejudices have subsided. We no longer hear apprehensions expressed respecting the danger of inoculating young men with scientific knowledge; on the contrary, the utility of such knowledge is generally admitted; but there are still many persons who do not acknowledge its necessity.

We have endeavoured to place the subject in every point of view before our readers, for the purpose of dispelling all doubts as to the essential importance of this kind of mental cultivation, as a means of promoting the safety of the public and the success of the pharmaceutist in his business. The arguments advanced in support of this proposition have not been without their effect, and the converts to the improved system of pharmaceutical education are daily increasing. But sentiments, however correct and forcible, when often repeated, supported by the same arguments and emanating from the same pen, are apt to lose some of their force in the mind of the reader. The words cease to make the same impression which they did formerly; and yet it is necessary from time to time to bring the subject prominently forward, taking advantage of passing events as a means of elucidating the arguments and showing the practical application of the principles laid down. Under these circumstances, the contributions of Mr. Ince, which have lately appeared among our editorial articles, have been very acceptable, containing as they do a similar train of ideas, cast in a different mould, and expressed in a style at once original and calculated to make an impression. To some of our matter-of-fact readers, the graphic descriptions may occasionally appear highly coloured; and we have heard it remarked that they are indebted to imagination for some of their embellishments. We do not think, however, that exception should be taken on this account to the articles, which are written,

not as statistical reports, but as illustrations of abuses belonging to the old system, contrasted with the modern improvements which it is the object of the Pharmaceutical Society to introduce. The instances adduced may be taken as types of the old school and the new, showing the difference, and pointing out, not only the compatibility of scientific attainments with success in business, but the paramount importance of keeping pace with the times in the acquirement of that scientific knowledge which is necessary for the efficient performance of the duties of the Pharmaceutical Chemist.

We make these remarks as a prelude to a letter from a correspondent (who has given us his name), and who thinks the picture of the abuses of the old school rather overdrawn. We admit that 300*l.* is a large fee for an apprentice in the country in the kind of business described; but had the fee been stated at 30*l.* or 50*l.* we could point to examples bearing a very close analogy to the one described by Mr. Ince. While we desire to place in the most forcible point of view the value of pharmaceutical education to all dispensers of medicine, we do not wish to disparage or to criticise those collateral branches of trade which, in a country town, are frequently inseparable from the business of a Chemist and Druggist. A qualified Pharmaceutist may, in obedience to the requirements of his neighbourhood, sell paint, grocery, or other miscellaneous goods. This may be necessary where the demand for medicines is not sufficient to keep up an establishment exclusively pharmaceutical. But the sale and dispensing of medicines by uneducated dealers in paint, grocery, &c., &c., is quite a different matter; and it is this practice which we desire to expose and discountenance, as dangerous to the public and an invasion of the province of the Pharmaceutist.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I am sure that I only express the feeling of your readers everywhere, when I bear testimony to the ability and deep interest of the articles in your Journal that are dated from Southampton Street. The fresh and racy humour which sparkles through the papers, and the varied attainments and eloquence of the writer, must ever render him a valuable and welcome contributor. And the devoted energy with which he pleads for the mental and physical improvement of the Pharmaceutical Chemist, must command the respect and deserve the thanks of all who have the prosperity of our Society at heart. But while all this is cheerfully acknowledged, it may yet admit of doubt, whether the rein has not been given too loosely to fancy, and whether the cause which the writer advocates may not sometimes have been rather injured than advanced by the means taken to promote it. Broad caricature and palpable exaggeration are hardly likely to be of real service to truth. Besides, this is a kind of treatment which everything may be subjected to, and it would be quite as easy to caricature the knowledge recommended for a Chemist and then to ridicule it, as to do so with the instruction approved by her Majesty's Inspectors in the schools which they visit. (See July, 1854, page 5.)

Take a few paragraphs as specimens:—

"The unhappy Chemist requires an apology when he dares to study, a suspicious character if he knows little—worse if he happens to know much." "Let us suppose a young beginner. He has served seven years' apprenticeship, three years counter practice, and then sets up. We do him the justice to suppose that he never despised a school; but, unhappily, never had its opportunities placed within his reach. Drugs are sent in and taken unexamined, for he has neither learnt Botany nor Materia Medica; his master told him both were useless. He makes nothing, for he cannot." (Feb. 1854.)

If it be said that these are meant for extreme or possible cases, that is not so stated; they are given as types of Chemists generally, at any rate of those "unacquainted with recent investigations," and if they are purely ideal and not meant to depict things as they are, they are wholly irrelevant, and only likely to deceive.

Is the following a faithful picture of a London house?—"The Assistant begins his daily work at half-past six or seven o'clock. He dusts the shop, &c., and dresses the window till breakfast. This cannot be taken in quiet, for he knows from long experience how his tea and toast are mingled up with castor oil, senna, and Epsom

salts. Immediately after it is work in earnest; pills, draughts, decoctions, mixtures, lotions, powders endless, and occasional plasters, mingle in a chaos. Porters rush off with boxes to the rail, customers of all sorts appear by turns, &c. At last the hour for dinner comes. When he has his meals at home the labour of the day is virtually unbroken, &c. Directly after, the same monotonous round, the same hard work, the same unending, never-ebbing, flow of business must be grappled with. The poor Chemist slaves on, the worn-out brain must toil, &c., till the hour of midnight relieves him." And his treatment is described by "weak tea which does little to recruit the exhausted energies of his weaker body, a scanty supper, and a solitary room." (Oct. 1854.) And this is put forth, not as the description of some solitary case, but as that of an Assistant's life in London. Now, are the principals of establishments in London, who do extensive business, willing to admit that this is a fair statement of the way in which they treat their young men, or will they not rather indignantly repudiate it, and declare that this is not "as it is," but a libel upon their character? Strangely enough there follows toward the close of this unfairly written paper the declaration "that it is of the deepest importance that a plain, unadorned statement of the actual condition of an Assistant should be presented;" and it is said "that if the principals were once acquainted with the facts, they would be more than willing to increase the happiness and promote the welfare of those around them."

Then take a specimen from the country.—"An honest youth, fresh from a grammar-school, looks genteel, and has a distinguished air, &c.; his parents think him no common child, so they go and pay £300 !! to a Chemist, where washing out bottles, cleaning windows, and mixing paint, consume the lingering day. Time rolls on—so five years make him an Assistant; but in all his occupations, though their name is Legion, he fails to trace the connexion between any one of them and Chemistry. So after removing to a town, where things are still worse, he comes to London full of expectations (which if any young man of twenty-one, who has had a grammar-school education, really did indulge, the sooner he was shaken out of his day-dreams, by a little rough reality, the better), and there he finds the food in an inverse ratio to the work, the rest scanty, snatched at intervals, in a chamber where the bottles are the curtains." I think that all who really know anything of a Chemist's business in the country, where the premium is £300 or the half of it, will come to the conclusion that very little is understood about it in Southampton Street, or that the writer has made discoveries as unsuspected by his fellow-mortals as those of the renowned Baron, whose surname was Munchausen.

Amusing these descriptions undoubtedly are, but I think it is hardly likely that they can conduce to the agreement and good understanding between Principals and Assistants, which is so much to be desired, and which affords the best hope of carrying out satisfactorily that improvement in education and comfort in business for which we are all striving.

I am afraid, also, that the constant representation of Pharmacy as drudgery, and the disposition to hold up to ridicule every mixed business and every addition to the distinctive occupation of a Pharmaceutist, will have a very injurious tendency. We are a body of tradesmen, it must never be forgotten, and not professed votaries of science. Our *chief* business is to buy, sell, or make drugs and chemicals, and to dispense prescriptions; and if any man think that putting up pills and mixtures and selling drugs is *drudgery*, by all means let him seek some other calling. Our chemical knowledge should have reference to this, and fit us to do it better, both for ourselves and the public, and the knowledge beyond (I may say even of chemistry) is a pleasure, and an honour, and a luxury; but that which must be guarded so as not to unfit us for the stern and often prosaic duties of our calling. I know that scientific acquirements of all sorts are sources of great delight to the rightly constituted mind; but we all feel, painfully sometimes, how very difficult it is to pursue these enjoyments with the quiet study and steady abstraction which they require, without injury to those active and discursive habits of mind which secure for us our daily bread. The apprentice may be pardoned for his inability to see any connexion between dusting the shop and wiping the bottles and his future success; but he will be better able to judge ten years hence. And the use of apprenticeship is not merely to give scientific knowledge, but to form the habits of the man, to convert the careless and inflated schoolboy into an active, civil, wakeful, and industrious man of business; and if it succeed in this, its lessons have been

more valuable than those of Liebig. And then, with regard to mixed businesses. We are scattered throughout the small towns, and the villages, and the thinly-peopled districts as well as the large towns and cities of Great Britain. And if we would gain a living, we must do it in the face of great competition and crowded rivalry; and the laws of commercial success will not be relaxed to favour the studies of a Chemist. The man who dwells in the midst of a grazing or agricultural district, will find it more important to him to have repute as a clever maker of sheep-wash or cow-drinks, than to be able to define the difference between common and ozonized oxygen; and a pot of Ung. Zinci will be far less in request than one of Venice Turpentine or Barbadoes tar. And if he treat with neglect all these things, as not having anything to do with Chemistry, he will find his syr. ferri iodidi spoil, even if it have three or four iron wires in it; and he will be left with plenty of time to select a colour for the "brougham" in which he is to ride by some fine morning, to the envy of his less fortunate neighbour. And even in a country town of ordinary character, he will find that rich, fanciful old ladies, who might delight in physic, are almost as scarce as aloes in blossom; and the few there are, probably tainted with homœopathy, while the fresh-colcured country lasses will prefer the shop where scented soap can be had as well as physic, and even the despised hair oil is civilly served, to that where amidst retorts and black doses the man of science dwells in lofty separation. He may certainly find more time to dig up his own taraxacum, but when he brings home a fine basket of it, the quantity needed in his own establishment will probably be—extremely small. I know, of course, that when the "brougham" comes it will make amends for this, but it is unpleasant at the time, notwithstanding.

I am convinced that our attempts to remove the ignorance which we deplore amongst our fellow Chemists, and to raise the standard of acquirement and scientific knowledge among them all over the country, will be wrong in principle, and fail of success, if we interfere with the selectness or general character of their business. That must be left to the wants of the neighbourhood and to the opportunities and commercial enterprise of the man himself. We have nothing to do with it. What we *do* desire is, that if he call himself a Pharmaceutical Chemist, he shall be a man well qualified to conduct the business he has chosen, and one to whom the public may safely trust their life and health; and what else he may be, must be left to him.

It is far from my wish to write a word in disparagement of science even in its abstrusest walks. It would be as contrary to my feelings as to my judgment, but as far as pecuniary results go, we must remember that the picture has its shadows as well as its light. That with all his unpriced endowments, no man needs the helping hand of plain sense and plodding business more than the man of science. That the history of every generation is vocal with the want, the suffering, and the broken fortunes of the men to whom we owe our most useful knowledge and our most treasured inventions. Our wisdom has been, too often, like our liberty, born of want and contempt and tears; and while genius has stood in the gloom and struck out the precious light, it has been useless to him, while groping shrewdness has caught it upon his dull torch, and found it guide him to security and a fortune.

I am, Sir, yours faithfully,

A Kentish Chemist.

FATAL ACCIDENTS.

We have before us a report of an inquest, published in the *Medical Times and Gazette*, and quoted in the *Dublin Medical Press* of Feb. 7th, in which a statement, reported to have been made by a witness, is so outrageous that it appears incredible, although in print. We give the report *verbatim*, as an instance of recklessness, rarely, if ever, equalled.

INQUEST IN WESTMINSTER.

The general evidence went to show that the deceased, Mrs. Manning, was an habitual drunkard; that she had been the subject of an attack of *delirium tremens* in October last, and that she was daily in the habit of taking large quantities of gin: that on the 16th ult. she had been taken by her sister to Cowen's establishment, who had given her a box of ointment, a large bottle of decoctum sarzæ, without any label of direction, but of which she was to take two table-spoonfuls four times a day,

and a soothing mixture (two ounces), of which she was to take a teaspoonful every night: that this bottle was also without direction, and merely had on it "morphiæ acetas;" that the deceased had returned home, had taken a dose of sarsaparilla, had gone to sleep on a sofa afterwards, on waking had insisted on having some gin, had then taken a dose of the soothing mixture, and retired to bed, her sister then leaving: that her husband came home late, about two A.M., and had found her asleep, breathing heavily; had spoken to her, without receiving any answer, and then, thinking her comfortably asleep, had gone to bed: that early in the morning, on waking, he had again spoken to her, and receiving no answer had stretched his hand across the bed to her arm, which he found cold: that he had immediately sent for Mr. White, surgeon, of Princes-street, who on his arrival pronounced her dead, and then sealed up the bottles, &c.: that the *post-mortem* had been conducted in the presence of Mr. Barnard Holt, senior-surgeon to the Westminster Hospital, Mr. White, and himself: that the appearances found did not account for the death; that he had found morphia in the contents of the stomach; that the bottle labelled "morphiæ acetas," which contained the soothing mixture, was two-thirds empty; that a careful analysis proved that each fluid drachm contained one grain of morphia, consequently the mixture had originally contained sixteen grains of morphia. The opinion of the medical witnesses was unanimous in attributing the death to the quantity of morphia taken. The verdict of the jury was—"That the deceased died from excessive drinking, accelerated by an overdose of morphia," censuring Cowen, however, for not labelling the medicines in a proper manner. During the inquest, Cowen observed that he had given a grain of morphia to a child; that morphia was like opium, and could be given in doses from five grains to five hundred.—*Mr. Rodgers in Medical Times and Gazette.*

An inquest was held on the 9th of February, at Bath, on the body of Dr. Tristram Whitter, who died in consequence of the accidental substitution of acetate of morphia instead of the solution, as prescribed by his medical attendant, Mr. G. Wood.

On the previous Monday Mr. Wood had furnished some medicine from his own surgery. On the following day he found the patient relieved, and wrote a prescription for a draught consisting of six drops of the solution of acetate of morphia, half a drachm of syrup of poppies, with some camphor mixture. The prescription was taken to a Chemist and Druggist, whose apprentice prepared it. But instead of the number of drops of the solution of acetate of morphia, he put in as many grains of the acetate in substance. The prescription was written in Latin in the usual way. The draught was taken in the evening. The next day, Wednesday, about ten o'clock, Mr. Wood was sent for, and he found the patient in a comatose state, from which he could not be roused. Mr. Wood immediately went to the Chemist. The apprentice, who was out at the time, said on his return that he recollected making the mixture. He could not remember the exact quantity of morphia, but it was more than a scruple. Four draughts had been prepared in one bottle, one-fourth being ordered to be taken every night. On being questioned, the young man stated that he knew the usual dose of morphia to be "from one-eighth of a grain to a grain." He could not account for the mistake.

The patient did not rally, but expired in the course of the evening. In the course of the examination at the inquest, numerous questions were asked respecting the orthography of the prescription, and the Latin abbreviations, with a view of ascertaining whether any ambiguity or want of distinctness in the writing could account for the mistake. The term used was "Sol. morph. acet. gtt. vj.," and it was suggested that the word "sol.," abreviated for "solutio," might be read "sal" (salt), and that "gtt." might have been mistaken for "gr." (grains). But these suggestions were not held to be tenable, and it did not appear that there was any want of perspicuity in the prescription. Nor, indeed, would this have justified a dispenser in furnishing a poisonous dose to a patient, it being one of the duties of the Pharmaceutist to consider the dose and the probable intention of the prescriber; and when he observes a doubtful quantity,

or what appears to have been an oversight, it is his duty to inquire what was intended before preparing the medicine. Posology (or the doses of medicine) is one of the subjects comprised in the examinations of the Pharmaceutical Society, and candidates are cautioned with respect to their responsibility in this respect in the event of a mistake occurring in a prescription. In the present case, several witnesses deposed that the prescription was perfectly clear, and that an apprentice of two years', or even a few months', standing, would be able to read it. The defence of the young man was that he had mistaken the words. The assistant, whose duty it was to superintend the apprentice, deposed that he had examined and tasted the medicine after it was prepared, but did not detect any error. The jury returned a verdict of manslaughter against the apprentice who prepared the medicine.

We have not thought it necessary to give a full report of this case, and have avoided the further exposure of names, the parties concerned having already suffered severely. We may state, however, that the apprentice has not passed his examination.

When we notice unfortunate cases of this kind, it is with a view of tracing, if possible, the cause of accident, in order to guard against similar occurrences in future.

Some persons, in reference to such cases, have recommended the adoption of English prescriptions as an infallible security against accidents. This is a popular delusion. To a qualified dispenser a Latin prescription is more familiar and readily understood than an English one. The language is concise and the abbreviations convenient and perfectly well understood. The chief or only difficulty in reading prescriptions consists in deciphering bad writing; and when words are illegible it matters little whether they are in English, Latin, or Arabic. It is, in fact, more easy, the quality of the writing being the same, to decipher the Latin than the English; and we have often seen prescriptions in which the directions for use were written in English, for the information of the patient, and quite illegible, while the formulæ, which were in Latin, were perfectly intelligible to the Chemist, although written in a similar style of orthography.

A knowledge of Latin may be taken to some extent as a guarantee of a liberal education, without which a young man would be more safely employed in measuring tape or ribbon, than in weighing morphia. The best security against mistakes is education tested by examination.

DROPS AND MINIMS.

We take this opportunity of recommending medical practitioners to discard the term *drops* (guttæ) in prescriptions. Before minim measures were invented, drops were orthodox in the absence of a more accurate mode of measuring small quantities of fluid. But drops are variable and uncertain in quantity, the size of a drop depending on the nature of the liquid, the size and shape of the bottle, the mode of dropping, and other circumstances. The minim is uniform and accurate. Drops are gradually becoming supplanted by the minim measure, even in the nursery; and we strongly recommend the profession to promote this desirable reform in prescriptions.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL.

Feb. 7, 1855,

The Lot, having been taken, was declared to have fallen on Messrs. Bell, Bird, Gifford, Hanbury, Herring, Hooper, and Macfarlane, who will remain on the Council for the ensuing year.

PHARMACOPŒIA COMMITTEE.

At a meeting of the Pharmacopœia Committee on Thursday, the 15th of February,

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR,

The list of Materia Medica was revised and prepared for circulation.

The following letter was received by the President:—

"*College of Physicians, Feb.* 13, 1855.

"Sir,—At a meeting of the Pharmacopœia Committee of the College of Physicians, held July 12, 1854, at which Mr. Deane, President of the Pharmaceutical Society was present by invitation, it was resolved:

"That the Pharmacopœia Committee of the Pharmaceutical Society is requested through Mr. Deane—

"1. To suggest any alterations which may appear to them desirable in the chapters headed 'Pondera Mensuræ,' &c., and 'Vegetabilia decorpenda et conservanda.'

"2. To inquire whether any medicinal substances, not contained in the Materia Medica, are so largely employed as to appear to deserve admission.

"3. To show to this Committee a copy of their Paper of Questions before circulating it among the Members of the Pharmaceutical Society.

"The Pharmacopœia Committee of the College of Physicians will meet on Wednesday, February 21st, at 3 p.m., at which meeting the Committee request you to favour them with your attendance, and with any replies that your Committee may be prepared to make to the above resolutions.

"I have the honour to be,

"Your obedient servant,

"Fred. J. Farre, M.D.

"*The Chairman of the Pharmacopœia Committee of the Pharmaceutical Society.*"

In accordance with the above communication, the President attended the meeting of the Pharmacopœia Committee of the Royal College of Physicians, and submitted for the consideration of the Committee the list which had been prepared for circulation among the members of the Pharmaceutical Society, which was approved, with a few verbal amendments. The President accordingly ordered it to be printed for circulation, with the following letter to the local Secretaries:—

"PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

"*London, Feb.* 26, 1855.

"Sir,—I am directed to transmit to you the accompanying Copies of the List prepared by the Pharmacopœia Committee of the Society, for your own use, and for such other Members of the Society residing in your locality, as you think likely and willing to afford assistance.

"If any further number of Copies should be required, I shall be happy to give immediate attention to your application for them.

"The success of the undertaking requires the largest amount of practical testimony

that can be collected, and I hope you will endeavour to secure a ready and energetic co-operation on the part of the Members in your neighbourhood.

"GEORGE WALTER SMITH, *Secretary.*"

QUESTIONS APPENDED TO THE LIST.

Are there any preparations or articles of Materia Medica used in your neighbourhood that are not contained in the accompanying List? If so, please to add them.

Be so good as to prefix letters to each of the articles in the List, indicating the frequency of their use, or otherwise, as follows:—

R.—Rarely.
V. R.—Very rarely.
N.—Never.
F.—Frequently.
V. F.—Very frequently.

Do you find difficulty or confusion to arise from the nomenclature of the present Pharmacopœia? If so, name the instances.

PHARMACEUTICAL MEETING,

Wednesday, Feb. 7th, 1855,

MR. DAVENPORT, VICE-PRESIDENT, IN THE CHAIR.

ON opening the meeting the CHAIRMAN alluded to the judgment in the Court of Queen's Bench in reference to the legal proceedings against the Society. He congratulated the Members on the result, but thought it right to inform those present that the plaintiff, Mr. Dickinson, had subsequently given notice of his intention to appeal to another Court. This was an additional proof of the spirit in which these proceedings had been commenced and prosecuted.

Mr. WAUGH said in the published account of the proceedings he had not seen any allusion to the costs. If the question was not out of place he would be glad to know how the question of costs stood.

Mr. MORSON replied that the verdict carried costs.

Donations to the Library and Museum were announced as follows:—

The Journal of the Society of Arts, from the Society of Arts.
The Journal of the Photographic Society, from the Photographic Society.
The Literary Gazette, from the Publishers.
The London University Calendar for 1855, from the University.
The Report of the Art Union of London for 1854, from the Art Union.

Specimen of *Silurus Parkerii*, the fish yielding the so-called "False Isinglass" of Para, from Mr. Stutchbury, of Demerara.

Specimen of Taraxacum Root, from Mr. Peter Squire.

Specimen of Egyptian Opium, from Mr. Thomas Herring.

Specimens of Cinchona Mutisii, Bark of Cinchona Calisaya, rough Calisaya Bark, Calisaya mondé of Guibourt, Six varieties of Cinchona lancifolia, Bark of Cinchona Condaminia, fine Crystals of Sulphate of Cinchonine, from Mr. John E. Howard.

Specimens of eight rare varieties of Cardamoms, from Mr. Daniel Hanbury.

A fine Specimen of Benzoin, from Mr. Tuff, of Enfield.

Specimens of Occidental China Root, Winter's Bark, Bitter Wood Bark, and a Root imported under the name of Sarsaparilla (all from the Island of Jamaica), from Mr. Roberts, of Moorgate Street. Presented through Dr. Hamilton.

Dr. FARRE made some observations on the report which had appeared in the *Pharmaceutical Journal* of what he had said at the previous meeting of the Society, the substance of which will be found in a letter at page 422.

The following papers were read:—

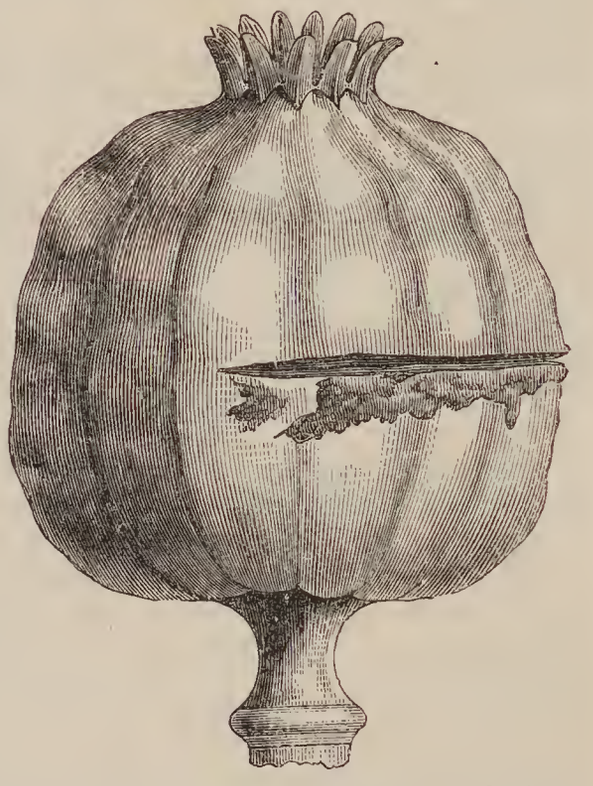
ON THE PRODUCTION OF OPIUM IN ASIA MINOR.

BY SIDNEY H. MALTASS, ESQ.

No crop is more uncertain than opium, as the poppy from which it is produced is liable to be injured, and even destroyed by spring frost, drought, or locusts. Winter snows and a mild rainy spring are most favourable to its

growth. The poppy requires a naturally moist and rich soil, further improved by large quantities of manure: the fields in which it is grown are repeatedly ploughed until the soil is completely pulverized. The seed is sown immediately after the first autumn rains until November, and in the highlands even later. It is sown broadcast mixed with sand, to avoid throwing too large a quantity. A *toloom* or hide of land (1600 square yards) requires from one-fourth to one-third of an *oke*, that is about three-fourths to one pound weight of seed. After the seed is sown, a harrow peculiar to Turkey is passed over the field; this harrow consists of planks nailed together, forming a square of about four feet, to which are harnessed one or two oxen; a man stands upon it, and drives the team over the field.

Early in the spring, when the plants have acquired some strength, hoeing and weeding commence, and continue until the flowering season; this occupation devolves principally on the women and children, who are all employed. It is not customary for large landed proprietors to grow opium, nor would it pay them, on account of the difficulty they would experience in procuring labourers on hire. Every peasant either possesses or rents as much land as he and his family can cultivate, and grows opium on his own account. About the end of May the plants arrive at maturity, and the flowers expand; they are mostly single, and either white or purple. A few days after the petals have fallen, the head or capsule is ready for incision. In this operation the whole family commonly takes part; it is performed in the afternoon of the day, and in the following manner: A transverse incision is made with a knife in the lower part of the capsule, the incision being carried round until it arrives nearly at the part where it commenced; sometimes it is continued spirally to half-way beyond its starting-point. The greatest nicety is required to avoid cutting too deep, and penetrating the interior coating of the seed vessel, as this would cause the sap or milk to flow into the inside. The following morning the capsules are scraped and the inspissated juice placed on a leaf; if the dew has been heavy during the night the yield is greater, but the opium is dark in colour; if on the contrary there has been no dew, then the yield is less, but the opium is of a lighter colour. A high wind is prejudicial, as the dust raised from the pulverized soil adheres to the exudation and cannot be separated. The poppy capsules are cut but once, but as each plant will from one stem produce several branches, and each branch produces a flower, it is usual to pass over the field a second or a third time, to cut such capsules as were not ready at the first cutting.



Poppy-head, showing the transverse incision (natural size).

The average yield of a *toloom* of land may be stated as $1\frac{1}{2}$ *chequees* of opium ($2\frac{43}{100}$ lbs.) and four bushels each of 50 lbs. weight of seed; 3 to 5 *chequees* per *toloom* is considered a good and full crop, and under very favourable circumstances a yield of even $7\frac{1}{2}$ *chequees* has been known. The amount produced is, however, exceedingly variable, as the following report of the actual yield of one *toloom* of land in four different years will show:—

1st year,	one *toloom*	produced,	of Opium,	$7\frac{1}{2}$ *chequees*
2nd	"	"	"	$\frac{1}{3}$ *chequee*
3rd	"	"	"	$2\frac{1}{4}$ *chequees*
4th	"	"	"	$4\frac{1}{2}$ *chequees*

After the opium is collected, the capsules are gathered and the seed shaken out and carefully preserved: the plants, or as they are termed the *straw*, being then given to the cattle. The seed is afterwards pressed in wooden lever-presses and the oil extracted; this oil is used by the peasants, not only for burning, but also for culinary purposes. The cake is given partly to cattle, and partly consumed by the poorer families, who pulverize it and mix it with their bread. A portion of the seed is also sold to Smyrna merchants, who ship it to Marseilles, where it is converted into oil for the soap-boilers. This oil is also used as a substitute for that of linseed. The poppy seed is black, brown, yellow, or white; some districts produce more white seed than others, and it is considered to yield more oil. The average render of oil is 35 to 42 per cent.

After the opium is collected, it is wrapped in poppy leaves and dried in the shade. Before it is ready for market, a meeting of buyers and sellers takes place before the *Mudir* or Governor of every district, and the price is discussed and fixed, or as it is technically expressed *cut*, to the satisfaction of both parties —this price not being *binding* to either. The buyers or merchants advance money to the peasants at an exorbitant rate of interest, usually 4 per cent. per month; as the Turkish law does not recognize more than 8 per cent. interest of money, and none at all when advanced against produce, the interest is added to the amount of the bond. The peasants are not bound to give their opium to their creditors provided they can find buyers at a higher price than that fixed, nor are the merchants compelled to take opium at the fixed rate if no one will take it off their hands.*

The duties levied are heavy: 10 per cent. are paid by the peasant for tithes, 9 per cent. by the buyer on arrival at a shipping port, and 3 per cent. more when shipped.

After the opium is purchased in the interior, it is put into thin cotton bags (which are sealed), and these bags into circular baskets, 80 to 100 chequees (130 to 162 lbs.) being the usual weight of each; to most of these baskets a proportion of *Chicantee* or inferior adulterated opium is added, usually about 5 per cent.; this *Chicantee* is opium mixed with sand, pounded poppy capsules, half-dried apricots, and in some instances turpentine, figs or gum tragacanth of inferior quality. The baskets are then sent to Smyrna, two on each mule, and upon arrival are stowed in damp warehouses, to avoid loss of weight: they are sold without being opened, and it is only when they reach the buyers' stores that they are opened in presence of the seller and of a public examiner.

The examiner then seats himself on the ground with an apron on and armed with a strong knife, an assistant emptying the baskets of opium before him; he then examines it piece by piece. By constant practice, he can usually tell by the weight if the opium is pure, but any suspected piece is immediately cut open, and if bad thrown aside as *Chicantee;* sometimes *Chicantee* is thrust in between two pieces of good opium, and it is then cut out and thrown aside: about ten minutes are required for the examination of each basket.

The strength and quality of opium are reckoned in *carats*, like gold, 24 carats constituting pure opium; but according to custom, the examiner must pass

* [Note by Mr. Wilkin.]—Money is advanced to the opium growers upon the security of standing crops, and it is stipulated in the bond that when the produce is collected the debt must be liquidated, either in money or produce, at the opening prices—it being optional on the part of growers to refund in money or produce. It is usual when crops have been collected, for the authorities to call a meeting for the express purpose of fixing, or as it is termed, *cutting* the prices, at which meeting growers and buyers are present. Supposing the price named at the meeting does not meet the approval of growers, but that the latter are not prepared to pay up in money, then buyers of their produce, at a higher rate than that proposed, must be forthcoming, who will engage at once to take the produce and redeem the bonds, otherwise they (the growers) must submit to the prices offered by their creditors. In the event of any competition, however, the parties who have made advances are entitled to the preference, at the prices actually fixed at the meeting.

as pure any which reaches 20 carats, all below that standard being thrown out as *Chicantee*. In purchasing opium, therefore, a difference of 20 per cent. *may* exist between the value of one basket and another, unless a previous examination be stipulated for on effecting a purchase. This condition is, however, seldom exacted when opium is intended for re-sale, as no difference of price is made in any European market for a difference of quality to this extent.

After the opium is examined, the tare is taken, including the chaffy seeds with which it was packed; these seeds, which are those of a species of *Rumex* called *Afion Oto*, or opium weed, are afterwards returned to the buyer to pack his cases. The cases are made large enough for the contents of one basket each, excepting those intended for China, which are two-thirds of the size, to facilitate their carriage across the desert to Suez.

I have observed that in London a distinction is made between Constantinople and Smyrna opium. No real difference exists. Some of the upper opium districts being at equal distances from Smyrna and the capital, the merchants who purchase in the interior send their opium to either city for sale. As Smyrna offers more advantages for smuggling, no opium has been sent to Constantinople for the last two years.

I observed, also, that Landerer discovered salep powder mixed with opium shipped from Smyrna.* Although I have no right to contradict so good an authority, I would suggest that the substance so discovered may have been common gum tragacanth, which is frequently used by the Jews in Smyrna, in the adulteration of opium; in fact, it is the principal substance they employ, and is cheaper than salep, and more easily procured. They make no secret of their method of adulterating, but they deny using salep, which, according to them, would be too expensive, even at its present reduced price, and would, besides, be much more readily detected. The purest opium is collected at Ushak, Bogaditz, and Simav; but the pieces are small and stick together, which makes it unsightly.

Karahissar and its environs produce one-third the annual crop, but the quality is not so good, and the pieces are usually larger.

For the following statement of crops in different districts, and the expense attending the cultivation, &c., I am indebted to Mr. Wilkin, a gentleman who has passed several years in the opium districts, and who is well acquainted with the languages of the country.

Subjoined is a list of the opium districts, with their amount of produce in two different years—one a full crop, the other a good average, the former about 3000 baskets, and the latter 2200. Last year (1853) the crop was only 1000 baskets, and this year it is but 600.

The following is an approximate statement of the expenses which would attend the cultivation of opium by paid labour, which gives an idea of the average cost of this drug:—

Estimate of Two Crops of Opium.

		Good fair crop.		Full crop.	
Karahissar district.	Karahissar	400	baskets	500	baskets
	Afion Cassaba	50	"	100	"
	Sandukli	200	"	250	"
	Sitchanli	60	"	80	"
	Karamuk	25	"	30	"
	Tzai	30	"	40	"
	Bolavadin	50	"	60	"
		815		1060	

* Vide *Pharm. Journ.*, vol. x., page 475.

		Good fair crop.		Full crop.	
	Brought forward	815	baskets	1060	baskets.
Karahissan district.	Ushak	250	"	400	"
	Ishikli	100	"	200	"
	Ekmé, Takmak, Coullah	100	"	200	"
	Tzal, Baklan	80	"	100	"
	Simav, Ghediz, Eneòvassi, Taouchanli	200	"	250	"
	Kutayah	40	"	50	"
	Boladitz, Eskihissar	30	"	50	"
	Ak Shair	250	"	300	"
	Yalavatz	250	"	300	"
	Karagatz, Sparta, Bourdroun	150	"	200	"
		2265		3110	

Calculation of the average expense and result of cultivating 100 Tolooms *of land with Opium, provided labour could be procured by usual wages.*

PRODUCE.	Piasters.
100 *Tolooms* of land—average yield of opium at $1\frac{1}{2}$ *chequee per toloom*=150 *chequees*, at piast. 80	12,000
Average yield of seed, 4 bushels per *toloom* = 400 bushels, at P.* 20	8000
	20,000

EXPENSES.			Piasters.	
Tithes, 10 per cent. on value of produce			2000	
Ploughing, 118 days, at p. 8			944	
Manure, 5000 loads (donkey) at p. 1 per load			5000	
Seed, 36 *okes* or 2 bushels, at p. 20			40	
Hoeing, weeding, &c., 400 days, at		p. 8	3200	
Making incisions	200 "	p. 8	1600	
Gathering	100 "	p. 8	800	
Collecting seed	100 "	p. 8	800	
Cleaning	100 "	p. 8	800	
Cattle food, &c.			240	
				15,424
Average gain to a grower			Piast.	4,576

The foregoing statement regarding the expense of cultivating the poppy and its yield of opium in various years, must be regarded as *approximative* only, as it has been obtained from ignorant peasants, who are never exactly correct, especially in figures. In Turkey there are *favourite* numbers amongst the peasants, 100 and 40 being those mostly used; 10, 20, and 5, are also favourites.

Presuming the grower should send this opium to Smyrna for sale, the cost would be as follows:—

	Piasters.
150 *Chequees*, at piast. 80	12,000
Packing charges	20
Inland duty at p. $5\frac{1}{10}$ per *chequee*	825
Carriage	300
Loss on money by bills, 2 per cent.	240
Factor's commission in Smyrna, 2 per cent.	200
Brokerage 1 per cent. on p. 100	100
	13,685

This shows a cost of p. 91.23 per chequee,
to which add ..... 9.00 " shipping charges to Europe

P. 100.23

Or, at the exchange of 110 piasters per £ sterling and usual equivalent per *chequee* of

* "P." signifies *piaster*. A Turkish piaster is worth about $2\frac{1}{5}d.$ sterling.

$1\frac{62}{100}$ lb avoird., it would cost 11*s.* 1*d.* per lb. free on board ; add charges in England, insurance, freight, &c., 5*d.* = 11*s.* 6*d.*

This year (1854) the crop of opium being only 600 or 800 baskets, the price at present (October, 1854) is p. 140, or 16*s.* 2*d.* per lb. on shipboard ; but were it not for the revolution in China, which diminishes the demand for that country, the price would be fully 20*s.*

The average price of opium in Smyrna is p. 100 per *chequee* of $1\frac{62}{100}$ lbs. ; to this added for commissions and duties, &c., 9 per cent., would give an average value in sterling of 12*s.* per lb. on board ship. The exchange on London varies from p. 110 to p. 115 per £ sterling.

This price of p. 110 must be reckoned when the crop is fair, say about 2000 baskets ; an increase on this quantity would reduce prices below p. 100, until a crop of 3000 would make prices fall to p. 60 per *chequee*, or about 7*s.* 2*d.* per lb., including shipping charges.

Mr. D. Hanbury said that a gentleman, Mr. Wilkin, who had witnessed the collection of opium in Turkey, and had communicated to Mr. Maltass some of the information contained in the paper which had just been read, was present, and would be happy to answer any questions that might be put to him on this subject.

Dr. Farre inquired how soon after the petals had fallen were the capsules cut for the opium ?

Mr. Wilkin replied that the incision was made shortly after the petals had fallen, and while the capsule was yet quite green.

Mr. Bentley inquired what length of time was allowed to elapse between the cutting of the capsule and the collection of the opium ?

Mr. Wilkin said they were cut in the evening and the opium collected the next morning. Those engaged in collecting the opium lay a large poppy leaf on the palm of the left hand, and, having a knife in the right hand, they scrape the opium which has exuded from the incision in each capsule, transferring it from the knife to the leaf, until a mass of sufficient size has been formed, when a second leaf is placed over the top of the mass. These masses were afterwards frequently adulterated. A substance made by evaporating the juice of the grape, and thickening this with flour, was often used for adulterating opium.

Mr. Bentley observed that the poppy capsules on the table, which had been sent to illustrate the mode of making the incision as practised in Turkey, had only one horizontal incision, which frequently extended only two-thirds round the capsule. This mode of cutting was different from that practised in India, where several oblique incisions were made. He thought this latter method likely to afford a greater quantity of opium than the former.

Mr. Wilkin said he had made several experiments by cutting the capsule in different ways, but he did not find that it made much difference in the product. In Turkey they preferred one horizontal incision, because there was less trouble in scraping off the opium than there would be if there were several incisions.

Mr. Giles thought the one horizontal incision, if it extended nearly round the capsule, would be likely to cut a larger number of the vessels from which the juice exuded, than incisions made in the other way.

ON THE FRANKINCENSE-TREE OF WESTERN AFRICA. (*DANIELLIA THURIFERA*, BENNETT).

BY W. F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

The tree that furnishes the product termed African Frankincense, though of plentiful growth in the peninsula of Sierra Leone and circumjacent regions, appears hitherto to have escaped the attention of the voyagers and travellers

who for so many centuries visited this part of the coast. The knowledge, therefore, with reference to its existence, can only be limited to a comparatively recent period, or within the present century. No mention has been made of this substance in the works of either Afzelius or Winterbottom, and all the information to be obtained is a traditional rumour that vaguely ascribes the discovery of its odoriferous qualities to one of those enterprizing Jesuit missionaries who visited Africa during the sixteenth century. This personage carried with him to Europe, on his return, a small sample of this gum, and so highly were its fragrant properties appreciated, when used in lieu of the ordinary incense, that this production would have become a valuable commercial export, had not the premature death of the priest, from the debilitating effects of climate, rendered abortive all attempts to ascertain the source from whence he had derived his supply.

The negro communities of tropical Africa, especially the female portion, have from a primitive age been in the habit of selecting several fragrant and aromatic gums, woods, roots, and leaves, with a variety of other substances from the vegetable kingdom, as articles of perfumery, to remove the disagreeable fœtor of the skin, and sometimes for the celebration of their religious and funeral rites, or with the object of adapting them to medical purposes. It is probable that under the authority of these sacerdotal customs, the Bdellium (*Heudolatia Africana*, Rich.), Copal, and the produce of other gummiferous trees, have attained a greater degree of importance among some nations than others, on account of their more exclusive appropriation to such ceremonies, and from the agreeable odour diffused by their combustion. On the other hand, the *Cyperus odoratus*, Lin. (?); *Ricinus Africanus*, Willd.; *Bassia Parkia*, R. Br.; *Arachis hypogœa*, Willd.; *Tuculla*, a species of Redwood; *Sesamum orientale*, Willd.; *Pentedesma Butyracea*, Don.; *Carapa Touloucouna*, Rich.; *Citrus Limetta* and *Aurantium*, Risso; *Daniellia Thurifera*, Btt.; *Elais Guineensis*, Willd.; and *E. melanococca*, Gœrt., and other sweet-scented roots and plants, are more generally devoted to personal appliances, and are proportionately esteemed, for their prophylactic efficacy in some cutaneous maladies.

The Frankincense tree grows to a large size, and may be distinguished without difficulty, by the erect and stately trunk and beautiful foliage. When of advanced age, its recognition is rendered still more certain by the peculiar grey or ash-like color of the bark, and massive divergent branches, which expand into a mass of foliage at an altitude of fifty or sixty feet from the ground, to a considerable distance around.

The mountainous districts to the westward of Freetown, and the wooded slopes in the neighbourhood of York, Lumley, and Goderich villages, are the localities in which it principally abounds, although it has been observed on the banks of the Sherbro and other adjoining rivers. If any credit can be attached to the assertions of several Ako' colonists, the same production has been met with on the forest declivities of Fernando Po, and is stated to be equally common in Yorruba, where it is known by the appellation of *Ogea* or *Ojeah*. This plant would therefore appear to be indigenous to various countries of the African continent, could any reliance be placed upon these reports; they cannot, however, be received with implicit credence, and until subsequent observations verify their correctness, must continue to be of doubtful value.

In Sierra Leone, the Timmané or Soosu designation of *Bungbo*, usually pronounced *Bungo*,* under which the gum is sold by the native traders, has also been conferred on the tree producing it, and hence the source of the term Bungo-tree. A few of the more remarkable botanical characteristics of this production demand a brief notice. During the early years of growth, the young

* "The fragrant gum called Bungo is the principal material one mason bee here uses for his dwelling."—*A Residence in Sierra Leone*, p. 218, *Ed.* by Mrs. Norton.

plant has the bark of a deep brown, which changes gradually in colour as it enlarges in magnitude. When of moderate size, the entire circumference of the trunk is studded by a series of horizontal excrescences, or oblong elevations in the cortical covering, of a pale or yellowish-brown hue, appearing in dense parallel but disconnected strata, a quarter of an inch or more apart, and varying from one-sixth to one inch in length, and about one to two lines in breadth. Being of a lighter tint than the surrounding portions, they are distinctly perceptible, and answer as a diagnostic peculiarity to identify the lesser shoots. As the tree approaches maturity, these elevated projections proportionately diminish, and the cortex, while partially retaining its smoothness, becomes traced by irregular patches of white or grey. In the course of time, these patches enlarge to that extent as to embrace in many instances the entire surface of the exterior. The inner cortical layers in plants of an immature development present a peculiar fibrous character, are delicately organized, and may be peeled off in smooth ribbon-like layers, which cannot be effected in the older specimens.

The gum, when of a natural exudation, mostly appears in a liquid state, of a white or pale straw colour, in some seasons oozing so copiously from the branches, that the ground and shrubs beneath are, from successive excretions, thickly covered with white spots. This effusion, however, does not occur so abundantly from the cortex, and when so produced, appear in thin and shallow layers, that mark their course by whitish streaks, that after their exsiccation on the trunk, present all the aspects of a saline efflorescence. The gum while in this state of fluidity cannot be collected for ordinary use. The substance offered for sale is widely different, from the effect of certain indirect agencies, tending to considerably modify both its qualities and secretion.

The Frankincense-tree is subject to the attack of a certain insect, termed by the natives *Tumbo*, which deeply perforates the bark in various directions. Its progress is attended by long and sinuous passages, the woody *debris* from which is ejected externally by a circular orifice about an inch in diameter. In the course of a few days, the gummy liquid issues largely from this aperture, blended with minute ligneous particles, which in their transit through these excavations, acquire a ruddy or brown tint, by degrees accumulating in small masses, and falling to the earth. In this state they become converted into dark brown fragments after a short interval, and are then gathered by the negro women and children, who resort to the woods with the express purpose of collecting them. Another mode of procuring this gum consists in stripping the dead or unsound bark from the wood, the more decayed portions of which are commonly saturated by the gummy exudation, and are found amalgamated with the woody fibre beneath in black crusts.

Great uncertainty prevails with reference to the period at which this tree flowers. Several colonists remark that they have not hitherto been seen, and the majority appear to be as equally ignorant on the subject. I observed the pod, however, was in a green condition early in March, from whence we may infer that the flowering probably commenced in December or January. The fruit is a coriaceous, thin, and dehiscent legume, from two to two-and-a-half inches long, and one to one-and-a-half inches wide, of an irregular ovate or semilunar shape, when ripe of a pale yellow color, and bursting into four segments, two inner and two outer, previous to their fall from the branches. Between the suture of the two former is embodied a solitary, flat, ovate-oblong, and chocolate-colored seed, which usually detaches itself from the sutures as they expand, and is suspended by a firm, funicular attachment to the inner surface of one of the external segments. The leaves are bipinnate, of a pale green pervaded by a greyish tint, that also characterises the trunk. In the younger productions they are of larger development, but the pinnæ are less numerous than in those of a later growth. It is unnecessary for me to enter into any further botanical details,

after the able delineation of the plant by Mr. Bennett in the *Pharmaceutical Journal* for last November.

Two kinds of frankincense, brought from the circumjacent villages, may be found in the market of Freetown, both of which are evidently the produce of the same tree. The first can be partly recognized by the dark-brown, or black shining and irregular fragments, from apparently having a larger amount of gum blended with the woody fibre than the other, which is met with in smaller and less compact pieces, more friable, and of a lighter brown or yellow tint, being chiefly constituted of manifold white, woody particles, cemented into masses by the excreted gum. Of these two varieties the latter is the least valued. They are, nevertheless, usually found intermixed in the samples offered for purchase.

The incense-like fragrance peculiar to these woody-resinous excretions, renders them available for a variety of uses. Occasionally they are had recourse to for the fumigation of houses in cases of sickness, but their ordinary appliance in the Sierra Leone districts, is that of a perfume among the native females. With this view they triturate the gum with lime manufactured from sea-shells, between two purposely adapted stones, and after their reduction into a fine powder, rub their bodies with it.

The bark, though endowed with similar odoriferous properties to a limited degree, is seldom or never resorted to for any personal or domestic employment. The ignition of the gum is rapid: a bright yellow flame, attended with a black or carbonaceous smoke, resulting. This is followed by the deposition of a viscid oleaginous matter, and the evolution of a remarkable aromatic and semi-resinous odour, approximating to that produced from the common pastiles for which they would form not an inappropriate substitute, either in the sick chamber, or on such occasions where an agreeable impregnation of the atmosphere was required.*

CONCENTRATED INFUSIONS.

Mr. F. Curtis renewed the discussion on this subject. Before commencing, he complained that some remarks which had been made by Mr. Bell and another Member, at the previous meeting, were not reported in the Journal.

Mr. Redwood said, they did not profess to report all that was said at those meetings. In fact, it would be impossible to do so, as they had no short-hand writer to take down what was said.

Mr. Morson thought it was very fortunate for some of the speakers that all that was said was not reported.

Mr. Curtis then proceeded to lay before the meeting the formulæ for the preparation of his concentrated infusions.

Infusum Anthemidis Concentratum.

No. 1.	Troy.
Chamomile flowers, single	5 oz.
Distilled water, boiling	20 oz.
Macerate for half an hour, then press strongly.	
Strained liquor	15 oz.
Rectified spirit of wine	2½ oz.
Distilled water	2½ oz.
Resulting product	20 oz.

* The wood-cut illustrating this tree was not ready in time for insertion this month, but will appear in our next number.—Ed.

No. 2.	Troy.	Avoird.
Chamomile flowers, single	5℔ =	4℔ 2oz.
Distilled water, cold	6 pints	Imp.

Macerate for forty-eight hours, then press strongly. Add four pints of distilled water to the pressed flowers, macerate for twelve hours and again press. Mix the liquors, and make up the whole if required, so that it shall measure..... 10℔ 16oz. Imp.
then add Rectified spirit of wine..... 24oz.

Resulting product ..... 12℔ 0oz. Imp.

Infusum Aurantii Concentratum.

	Troy.	Avoird.
Orange peel	32oz. = 2℔	3 oz.
Lemon peel, fresh	12oz. =	13 oz.
Cloves	4oz. =	4½oz.
Distilled water, boiling	8 quarts	

Macerate for twelve hours and press ; then boil up, and lastly gently evaporate the liquor to six pints, 17oz. Imp., then add

Tincture of lemon	6 oz.
Oil of cloves	40 drops
Rectified spirit of wine	16 oz.

Resulting product..... 10 pints old measure

Infusum Calumbæ Concentratum.

	Troy.	Avoird.
Calumba root, bruised	40oz. = 2℔	12 oz.
Distilled water, cold	q.s.	

Place the calumba in a displacement apparatus, and keep displacing with cold distilled water until nothing bitter remains. Then gently evaporate the liquor at a low heat until reduced to..... 8℔ 12oz. o.m.
when cold, add Rectified spirit of wine..... 20oz.

Resulting product ..... 10℔ 0oz. o.m.

Infusum Gentianæ Concentratum.

No. 1.	Troy.
Orange peel, dried	4oz.
Lemon peel, fresh	8oz.
Distilled water	18oz.
Rectified spirit of wine	6oz.

Cut the peel small and macerate for a week, then strongly press.
Resulting product ..... 22 fluid ounces
Make an infusion of the gentian root thus :—

Gentian root	4oz.
Boiling water	40oz.

Macerate for four hours, strain off without pressure ; gently evaporate down to 16oz. When cold add it to the infusion of orange and lemon peel (*ut supra*). Lastly add Rectified spirit of wine..... 2oz.

Resulting product ..... 40 fluid ounces

No. 2.	Avoird.
Gentian root, sliced	4½℔
Orange peel, dried	4½℔
Lemon peel, fresh	9 ℔
Distilled water, boiling	9 gallons

Macerate for forty-eight hours and press strongly, then heat the liquor to the boiling point, and pass it through a felt bag. Lastly evaporate gently, so that the liquor shall measure..... 8½ gallons o.m.
add Rectified spirit of wine ..... 1½ gallon

Resulting product..... 10 gallons o.m.

Infusum Rhei Concentratum.

	Troy.
Rhubarb root, bruised	24oz.
Distilled water, cold	q.s.

Macerate in a warm place for twelve hours, and afterwards place it in a displacement apparatus, and percolate with distilled water until all the active matter is obtained.

Then gently evaporate down to	8lb	12oz.	o.m.
When cold, add Rectified spirit of wine		20oz.	
Resulting product	10lb	0oz.	o.m.

Infusum Sennæ Concentratum.

	Troy.	Avoird.
Alexandrian Senna	10lb =	8lb 12oz.
Ginger root	32 drachms	
Boiling water, sufficient to wet the senna		

Macerate for twelve hours, and press strongly. Add one gallon more of boiling water to the pressed senna, macerate for two hours and press again. Then evaporate the liquors to ..... 8lb 8oz.

Pass it through a felt bag, and then add

Rectified spirit of wine	1lb	8oz.

and sufficient water to make the resulting product..... 10lb 0oz. o.m.

Mr. Curtis said that, notwithstanding the existing prejudice against the use of concentrated infusions, he felt satisfied that, with a few exceptions, they were in a marked degree superior to those prepared according to the present London Pharmacopœia. The infusions of chamomile, clove, buchu, and orange-peel, were the exceptions to which he referred. Concentrated infusion of chamomile was not required, as the period of maceration was so short, that it could be made whenever it was wanted. So also could infusion of orange-peel. He considered concentrated infusion of gentian one of the best of this class of preparations. A specimen which he had placed on the table would be found, when diluted, closely to resemble that made by the Pharmacopœia process, with this advantage, that it would be always the same. He had prepared some infusions by the processes of the Pharmacopœia for comparison with his concentrated infusions. In the case of infusion of chamomile he admitted that that made according to the Pharmacopœia was the best. He might remark with reference to this infusion, that in straining it the chamomiles were sometimes pressed with the hand to remove the large quantity of infusion which they absorbed. This practice, however, was very objectionable, as it destroyed the brightness of the liquor.

Although concentrated infusion of orange-peel was one of those not much wanted, and as hitherto made was not quite equal to that made according to the Pharmacopœia, he expected to be able to make it, equal to fresh infusion, by adopting a process similar to that marked No. 1, for concentrated infusion of gentian.

He considered infusion of calumba one of the most important in the Pharmacopœia, yet the process of the London Pharmacopœia was decidedly objectionable on account of the great quantity of starch taken up when boiling water was used. He instanced a case in which infusion of calumba had been ordered in a prescription, together with iodide of potassium and nitric acid, the effect of which was the formation of a dark blue mixture, very different, he believed, from what the physician intended to order. He thought infusion of calumba ought to be made with cold water, and his concentrated infusion of calumba was so made.

The concentrated infusion of rhubarb, when diluted to the required extent,

was perfectly bright, while that made according to the Pharmacopœia was not, and it possessed all the aperient and stomachic qualities of the rhubarb.

It was well known that infusion of senna, made according to the Pharmacopœia, soon throws down a deposit of inert matter, and is subject to change in other ways. The concentrated infusion of senna he considered to be superior in flavour and appearance, and to possess the advantage of being always uniform in strength.

Mr. Giles was glad that he had an opportunity of expressing himself upon this subject, the more so as his views, which he believed were shared in by a large section of the Members, did not appear to have been decidedly comprehended in any of the remarks reported in the Journal, and he could not but think that the discussion, so far at least as it was recorded in their own organ, was most unsatisfactory, and likely to exert a pernicious influence. He himself regarded the infusions as the most reliable and unexceptionable preparations in the Pharmacopœia, and could not sympathize with any considerations where their efficiency was not made paramount. If this was imperiled there could be no justification for consulting the mere convenience of the Pharmaceutist; but if there were any who persisted in making it a trading question, it would be easy to show the impolicy of the present course. If concentration was admissible, what was to prevent it from being carried to its only natural limit—the solid form? And what would then become of the interests of the Pharmaceutist, who found the more laborious and less profitable compounding of pills usurping the place of the usual preparations? This was an argument for which he ought to apologize, and he hoped there were few with whom it would have any influence comparable with their anxiety to discharge to the best of their ability their duty to the sick.

The Journal reports that Mr. Bell introduced the subject at the last meeting, by quoting the processes by which certain concentrated infusions on the table had been prepared, and that he further suggested the advantage of prosecuting these experiments in the hope of attaining still better results. As though the admitted desideratum were "to find a substitute," and the only question "the best means of accomplishing it." It was true that he afterwards cautioned Members against unauthorized substitution of the one for the other, but with such tempting facilities at hand, invested *now* with a quasi-authority, it was scarcely to be expected but that substitution would become more frequent. It would be a farce to affect ignorance of the fact that they were even now largely, very largely used where P. L. infusions were intended, and it was his fear that the agitation of the subject up to the present point, would tend to increase that substitution by underrating its ill effect, while it feebly deprecated the practice. He considered it was as improper as the employment of half-and-half for proof spirit, and as unwarranted as the manufacture of syrup of poppies from treacle and laudanum. He had been sorry to see at a meeting at the head-quarters of Pharmacy that Dr. Farre felt it necessary, on account, he supposed, of this feeble expression of condemnation, to caution the Members against such a substitution. This caution—albeit implying censure—was one for which Pharmacy should be grateful, and he hoped would manifest its gratitude; not by recommending inferior substitutes, but by such a cordial co-operation in the compilation of the New Pharmacopœia, and such integrity in the execution of its intents, as should connect Pharmacy with Medicine by a legitimate alliance advantageous to both, exalting the one and strengthening the other. He differed from Mr. Bell as to the proper object of this discussion; the true inquiry was, "What was the best mode of administering such medicines as calumba, cascarilla, gentian," &c.? and he would adduce his reasons for an uncompromising adherence to the form of infusion which he believed to be emphatically the best. In the first place, no defect was alleged against the infusions; it was quite clear that the maceration of the extemporaneous infusions might be as perfectly performed as the maceration by which a liquor

for subsequent concentration was obtained, and it was quite absurd to refer (as had been done that evening) to a concentrated infusion of calumba *without starch*, as an illustration of the superiority of concentrated infusions; since it was, of course, as easy to apply cold maceration in the one case as in the other. It was therefore evident that the fresh infusions might afford the best possible results, if the necessary conditions of the proper solvent, in its proper state, as regards temperature, &c., and the proper period of maceration were observed. But it was not only that no advantage was to be gained, he contended that there was a real and practical evil in the dissipation and destruction by the process of evaporation of the more delicate aromatic properties which they had every reason to suppose were important agents in inducing debilitated stomachs to tolerate medicines. This was not likely to have escaped notice, and accordingly they found that Mr. Bell had proposed an ingenious expedient to meet the difficulty; the plan was to partition the percolated liquor, so that the first part might not be subjected to evaporation. But did they think it possible that a satisfactory proportion of the aroma of four ounces of gentian, four ounces of dried orange-peel and eight ounces of fresh lemon-peel, would be exhausted by sixteen ounces of water; or let the experiment be tried with six ounces of cloves, and a similar measure of water, and so far as the essential oil (the important ingredient) was concerned, he would prefer to use an infusion made by the P. L. process from the marc thus percolated rather than any concentrated preparation that could be so obtained.

In the face of these objections what advantages are to be found in the concentrated infusions? The answer is, convenience. A convenience which we may assume, from the scanty contribution of specimens referred to by Mr. Bell, is obtained by that curse of Pharmacy—the tendency to transfer all its most interesting operations to wholesale houses; and he did not admit that the preparation of infusions was an inconvenience of which Pharmaceutists had occasion to complain, or which justified the pains taken to provide a substitute. There was one point which the advocates of P. L. infusions ought not to shrink from alluding to—infusions should not only be Pharmacopœial, but *fresh*. He was willing to admit that concentrated infusions might be better than stale ones; not that it was likely that a Pharmaceutist would deliberately send out a *stale* infusion, but possibly sometimes, so far from fresh, that the mixture might become spoiled before it was consumed. This should of course be resolutely resisted. Infusion of calumba, for example, should never be sent out more than twenty-four hours old. Upon these grounds he was suspicious of all expedients for prolonging the duration of infusions beyond their natural period, such as the mode recommended by Mr. Redwood, of keeping them in air-tight bottles, or that suggested for infusion senna, by the addition of a small quantity of nitrate potash. He looked upon these expedients as snares which would draw them aside from the rigid adherence to fresh infusions, which he believed to be essential to the most successful administration of the medicines involved. He felt assured that the fresh infusions possessed a sapidity and delicate flavour which invalids could readily distinguish, and did not fail to approve; and he was convinced that no peculiarities were more easily recognized or more thoroughly appreciated than the employment of fresh infusions, true distilled waters, and home-made powders.

The Chairman thought the meeting was much indebted to Mr. Giles for the pains he had taken to state so fully the opinions he entertained on this subject. It appeared to him, however, that some of the considerations which had led to the discussion of this subject had been overlooked. There was a considerable demand for concentrated infusions, and it was very desirable therefore that they should be made in the best possible manner. He thought that some of them were very good and useful preparations, and if their use could be sanctioned by the College, it would lead to greater uniformity being observed in their preparation. Mr. Giles had confessed that infusions ought not to be used unless

they were quite fresh; yet how difficult was it always to ensure this condition, especially in certain states of the weather. If more permanent preparations could be produced possessing the properties of the infusions of the Pharmacopœia, he thought it would be a great advantage.

Dr. Edwards thought that Mr. Giles had been unnecessarily alarmed with reference to the effects to be anticipated from the discussions which had taken place on that and previous evenings on this subject. He could not conceive that Pharmaceutists stood on such slippery ground as Mr. Giles seemed to imagine. Were they so susceptible of temptation, that a bottle of concentrated infusion could not be kept on the shelf without their instinctively going to it when the infusion of the Pharmacopœia was ordered? To fear such a result was greatly to underrate the judgment and moral integrity of the body to which they belonged. He thought, if Mr. Giles had been present at the previous meetings when the subject of concentrated infusions was discussed, he would have found that there was no disposition evinced to justify the substitution of concentrated infusions for those of the Pharmacopœia in ordinary dispensing. There was, however, a considerable demand for concentrated infusions, and Pharmaceutists being obliged to keep them, very naturally inquired what was the best mode of making them.

Mr. Redwood, while he fully admitted the value of many of the observations which had fallen from Mr. Giles, thought, nevertheless, that there was a defect in his general argument and a fallacy in some of his positions. The defect in the argument to which he referred, arose from the fact that Mr. Giles had assumed that which it was the object of the discussion to investigate. He had assumed that infusions made according to the Pharmacopœia were superior not only to the concentrated infusions now met with in commerce, but to any that could under any circumstances be produced. Now, he (Mr. R.) thought the first question that presented itself in the discussion of this subject was, what relation do the concentrated infusions bear to the infusions of the Pharmacopœia which they are intended to represent? This was a legitimate subject for inquiry, and the discussion of it was calculated to do good. Many would go home and institute inquiry and comparison, which otherwise might escape their attention. If the comparison should prove disadvantageous to the concentrated infusions, which he believed would generally be the case, then another question would arise—Is it possible to improve the processes at present adopted for the preparation of concentrated infusions, so as to make them fairly represent the infusions of the Pharmacopœia? They ought not, without investigation, at once to assume that such a result was impossible. He could not agree, therefore, in the objection which had been urged by Mr. Giles against the course pursued by Mr. Bell, who, finding that the concentrated infusions of commerce did not equal the infusions of the Pharmacopœia, made some experiments with the view of ascertaining whether any improvement could be effected in them. He thought there was a fallacy in the position which had been put forth with some effect by Mr. Giles, that the question of convenience in dispensing was unworthy of consideration. It surely could not be denied that Pharmaceutists, who had not sufficient dispensing business to justify their having the different infusions made fresh every morning for the day's use, often found it difficult to satisfy their customers that several hours would be required for preparing a prescription which at another establishment, where infusions were kept ready, had been made up in a few minutes. This was an inconvenience for which they were justified in seeking a remedy, although certainly the remedy ought not to involve any diminution in the efficacy of the medicines used. To what extent such a remedy could be provided was one of the questions comprised in the subject they had been discussing, and he thought it was a perfectly legitimate one.

Mr. Bastick agreed with what had been stated by Mr. Redwood. He had hoped, after what had been said on former occasions on this subject, that no further reference would be made to what he might call the moral question, that

is, whether they were justified in substituting concentrated infusions for the infusions of the Pharmacopœia in dispensing. This part of the subject had, he thought, been disposed of. But there was another question which he might call the chemical question, which was, can concentrated infusions be produced that will fairly represent the infusions of the Pharmacopœia? He thought it too much to assume that they could not, and the Meeting were indebted to Mr. Bell and Mr. Curtis for bringing forward the results of experiments in reference to that question.

Mr. Hooper thought it ought not to be lost sight of, in the discussion of this subject, that large quantities of concentrated infusions were used by medical men in their practice. This was a proof that they were found to be efficacious, and as the Pharmaceutists were the legitimate manufacturers of these preparations, it was right for them to inquire what was the best mode of making them.

Mr. Giles thought it was scarcely fair to conclude that he had assumed upon insufficient grounds that concentrated infusions *could not be made* equal to the fresh. He had not hastily formed his opinion, but it was a fact that, after great attention had been devoted to them for ten years, he considered them unsatisfactory, and he saw difficulties to be overcome which it was not in the nature of things could be *perfectly* surmounted, and which therefore made him of opinion that it was best to discountenance further efforts, and chiefly for this reason, that the practical result would be to substitute them for more efficacious preparations. He could not agree that the convenience of the patient was concerned to any considerable degree, as none of the infusions were "emergency" medicines, the infusion senna being the only one which approached that character; and as for the different circumstances of large and small businesses, it was only for the small concerns to manage with their infusion of gentian as the larger did with buchu or rhatany, and they would find no greater inconvenience to complain of.

PHYTOLOGICAL CLUB,

17, *Bloomsbury Square*, *February* 14*th*, 1855,

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Several new Members were proposed for admission.

A donation of specimens of the *Arenacia ciliata*, collected on Ben Bullen's Island, by Dr. Melville, was forwarded for distribution amongst the Members of the Club, through Mr. Deane, and for which the thanks of the meeting were unanimously passed.

A vote of thanks was also unanimously passed to Mr. Greaves, for his active exertions whilst Curator, in promoting the objects and welfare of the Phytological Club.

A letter was read from Captain Head, R.N., of Falmouth, stating that the plan of cutting off the haulm from the potato plant as soon as the disease had began to manifest itself had been extensively carried out by a gentleman who farms on a large scale near Falmouth, with great success. The tubers were dug up as wanted, and almost every potato proved extremely good and apparently free from disease.

Mr. Daniel Hanbury gave some account of a botanical ramble in the South of France, made in the early part of last summer. Some comments were offered upon the peculiar features of the vegetation of the district known to botanists as the *Olive Region*, as for instance, the large number of *Leguminosæ*, *Compositæ*, and *Euphorbiaceæ*. The rich character of the Flora of Toulon, and the adjoining shores of the Mediterranean, was also noticed. The paper was illustrated by specimens and sketches.

Mr. Grundy promised a paper on "The Structure of the Starch Granule" for the next meeting.

The meeting was then adjourned to March 14th.

LIVERPOOL CHEMISTS' ASSOCIATION.

A Meeting of this Society was held on Friday evening, 19th January, the President, Mr. E. Evans, in the Chair, when Mr. T. C. Archer delivered his second lecture on

ECONOMIC ZOOLOGY,

Of which the following is a brief sketch:—

The former lecture on this subject comprised a sketch of the Vertebrate kingdom—this comprises the Invertebrate, or boneless portion. The classification commences with the Mollusca, animals having very soft bodies, frequently covered with a cretaceous shell. Among the more important of these is the Avicula margaritifera, which yields mother-of-pearl. The annual import of these shells into Liverpool is from 300 to 400 tons, and altogether into the whole kingdom, about 1000 tons. There are three varieties recognized in commerce, and some of them are exceedingly large and handsome. The pearls which are found in these shells are certainly the result of accidental circumstances, and are not formed naturally. They appear to arise from irritation of the mantle, grains of sand getting in between the membrane and the shell, causing an unusually large quantity of the pearly matter to secrete in one spot. The Cypræa moneta, or cowrie, is a shell which plays a very important part in the commerce of the world, especially on the coast of Africa, hundreds of tons being sent annually, principally from Liverpool, to purchase palm oil, &c. Cuttle fish is a soft calcareous shell, deposited in the mantle of the animal, and sometimes, though erroneously, called a bone. It is obtained from the Sepia officinalis, one of the Cephalopods, from which order we also obtain India ink and Sepia.

The class Crustacea contains the crab, lobster, crawfish, shrimp, &c., species which are all more or less used for food. Crabs' shells were formerly ground and employed in medicine; but as they consisted principally of carbonate of lime, they have been superseded by prepared chalk.

From the class Arachnida, or spiders, we at present obtain no useful article; but Mr. Archer did not consider it at all unlikely that we should at some future day, as he had seen some spiders from the Indian Archipelago with cocoons of silk, almost as large as those produced by the silkworm.

Insecta is a very important and interesting class, as it furnishes us with many substances used in Pharmacy. In the order Hymenoptera are contained the bee, wasp, ant, &c. Of the natural history of the bee, from whose labours both honey and wax are obtained, Mr. Archer gave a very interesting sketch. Honey from the hive is very nearly in the same state as when it was taken from the flowers; but wax is secreted by the insects themselves, in little scales, which are worked by the jaws and feet, and used to form the cells of the honeycomb.

From the order Lepidoptera we derive one of the most valuable articles yielded by any of the Invertebrata—silk, which is secreted by the animal in the form of a fine yellow transparent gum, and is, when first obtained, so exceedingly fine, that unless some art was employed in unwinding the cocoons, it would be perfectly useless to us; this is effected by winding off several cocoons together, and as each thread is covered with a little gummy matter, they unite together, and ordinary silk is the result. The silk-worm has occupied a very important position in the commerce of the world for a long period of time. It is not known whether or no it is alluded to in Scripture, there being a vague allusion, which may refer to it in Ezekiel; but the first definite reference is in Aristotle. The country in which the cultivation of the silk-worm has been most largely developed is China; for when we first became acquainted with the inhabitants of that country, they were all clothed in silk, and that of a very superior description. The principal silk-producing insect is the Bombyx mori, and it feeds on mulberry-leaves alone, a circumstance which has materially interfered with the development of our silk manufacture; but lately a new species has been discovered in India, which seems likely to change the whole character of the silk trade. It is the Bombyx cynthia, a silk-worm feeding on the leaves of the Ricinus communis, or castor-oil plant.

The annual consumption of raw silk in this country is 2206 tons, and of manufactured, 510 tons; and when we consider that this is the consumption of one country only, and all the produce of one small insect, it appears perfectly surprising how the industry of man could collect such immense quantities together, and elaborate it into articles of attire, richer and more beautiful than any derived from other sources.

The order Hemiptera furnishes the Coccus cacti or Cochineal insect, a native of

Mexico, where it feeds almost exclusively on a species of cactus. There are 1000 tons, of the value of £149,000, annually imported into this country.

The order Coleoptera comprehends a very large number of species, the most important of which is the Cantharis vesicatoria, or blistering fly, abundant in different parts of Europe, the most esteemed coming from St. Petersburg. There were four new varieties of cantharides from India shown at the Exhibition of 1851, and lately several other species have been brought over. In the class Annulata we find the leech, an animal, Mr. Archer remarked, whose history was so full of interest as to require, to do it justice, an evening to itself. The annual imports are 8,000,000, besides a large number collected in this country.

The class of Zoophytes comprises the corals, the animal character of which was once doubted, as the structures they form have an exceedingly plant-like aspect. Corals were formerly used in medicine, but now only as ornaments.

Sponge is an animal, and one of the most interesting of the polyps we are acquainted with. There are a great many varieties of sponge, and in the Sydenham Palace is a collection belonging to Mr.Bowerbank,containing several scores of different species. When alive the fibrous network, which is the skeleton of the animal, is covered with a gelatinous coating, in which it is supposed its vitality is centred. When examined in its living state beneath water, a regular expansion and contraction of the sponge may be noticed, and a current of water is seen to issue from the vents. No intermission is noticed, and these currents, it is very evident, carry the nutritive matter contained in the water into the body of the sponge, and also carry off the particles which may be excreted. Our principal supply of sponge comes from the Grecian Archipelago and the West India Islands.

After a vote of thanks had been passed to Mr. Archer for his very valuable lecture, which was extensively illustrated by specimens and diagrams, the Secretary announced the receipt of a pamphlet by Professor Lowe, "On the Chemical Equivalents of certain Bodies, and on the Relations between Oxygen and Azote."

February 2nd.—Mr. Clay in the chair, when a paper was read,

ON THE WEIGHTS AND MEASURES OF THE PHARMACOPŒIAS.

BY MR. ABRAHAM.

As a revision of the Pharmacopœia is proposed, and discussion invited, I offer a few remarks upon the weights and measures.

A Pharmaceutist in this country has now in use two sets of weights of similar denominations but of different values. He has a pound of 7000 grains and another pound of 5760 grains—an ounce of 480 grains and an ounce of 437.5 grains—a drachm of 60 grains and a drachm (little known) of 27.344 grains. By one set of these he is required, by the College of Physicians, to compound their prescriptions, by the other he is required by law to sell his goods. In the sister country of Ireland he requires a drachm of 54.68 grains, and a scruple of 18.22 grains, the English scruple being 20 grains, and the prescriptions of the Physicians of that country are to be compounded by avoirdupois weight, so far as respects pounds and ounces, whilst in this country and in Scotland the Colleges prescribe by troy weight.

Here are elements of confusion, of error, and of loss of time. The Pharmaceutist has to calculate his formulæ in one denomination and their cost in another. He has seldom a troy weight exceeding one pound, and if he operates upon larger quantities of materials he must convert one denomination into another, and in the same formula he may find it convenient to use avoirdupois pounds and troy ounces and drachms. In our Dispensatories, or at least in the only one of them that I have examined since the Dublin College adopted the avoirdupois weights, the terms *ounce* and *pound*, meaning avoirdupois ounce and pound, are used in the same page with the same terms meaning troy ounce and pound, without intimation of the fact, except by the tables in another part of the work, and I have observed that even the compiler has in some cases forgotten the distinction and made erroneous calculations accordingly. Persons who desire to compare the relative strengths of the preparations of the Pharmacopœias, are liable to be constantly misled by the different values of the same terms. A Chemist's receipt-book is particularly liable to receive entries of weights the values of which cannot be known.

I suppose the truth of these remarks will be generally admitted, and I have next to consider what remedy can be applied. The introduction of a *decimal* system is exceedingly to be desired, and the Legislature will doubtless eventually compel its

general adoption. Although, however, the application of such a system to our coinage may not be very distant, I fear it is otherwise with respect to weights and measures, and if the College of Physicians can ameliorate the present system, they have shown such a laudable desire to avail themselves of the suggestions of practical men, that I think they will not hesitate to do so.

The College can enable us to dispense with the use of different weights bearing the same value, and I trust they will do it. This they can only do by discontinuing the use of *troy weight*, because we must sell by avoirdupois weight until the Legislature adopts some sweeping scheme of reform.

My principal object is to show that the *imperial pound* and *grain* are the only weights which need be used in the College formulæ. The former, containing exactly 7000 grains, any number of grains are easily converted into avoirdupois pounds and grains, and with a few smaller weights, bearing a decimal relation to it, any weight expressed in pounds and grains is readily obtained. The following I find to answer the purpose; and their use, even now, I find to save calculation and to promote correctness: 6000,3000,2000,1000,600,300,200,100,grain weights in addition to the ordinary drachm and grain weights. With such denominations of weights in our formulæ, and such weights in our pharmacies, the operations of multiplication, division, subtraction, and addition, would be performed with greater despatch and accuracy than at present, as I can confidently affirm from my experiments. The change would cause no confusion, for Chemists using the Pharmacopœia would appreciate it at once, and the term *pound* very rarely occurs in prescriptions, and when it does it is generally used to express an old pint, which is nearly identical with the avoirdupois pound of water.

It would be a step towards obtaining a common standard in England and Ireland, but I cannot recommend the adoption of the weights invented by the Dublin College called *drachm* and *scruple*. They are not simple multiples of the grain, and add to the confusion of terms. And here I confess a difficulty occurs in forming a consistent plan. Although the terms *ounce* and *drachm* would be properly abolished from the College formulæ they would continue to be used by prescribers, and I suppose it is necessary that the College should define their values. The substitution of the avoirdupois ounce for the troy would cause little or no inconvenience; but the substitution of the avoirdupois drachm of twenty-seven and a fraction of a grain, for the present troy drachm of sixty grains would cause serious mistakes, for such changes are adopted very slowly, and the dispenser is puzzled to know whether the prescriber bases his orders on the new or the old law. A notable example of this is well known to us in the case of the pint, which, nearly twenty years ago the College enlarged to contain twenty ounces—a fact of which many prescribers take no notice, and dispensers are frequently puzzled to determine which is intended—new or old—and I believe frequently err. But I may observe that this causes no confusion in the preparation of the College formulæ, the change being well known by every one who uses the Pharmacopœia. If, therefore, the terms ounce, drachm, and scruple must be retained, it appears to me, that whilst the avoirdupois ounce might very well be introduced into the new system, it would be better that the drachm and scruple, which are multiples of the grain by integer numbers, should be retained.

I have not much to say about measures. The College use the imperial gallon, containing 70,000 grains of water. A fluid pound avoirdupois is exactly a tenth or 7000 grains, and if they would restore the minim to its former dimensions, and make it a fluid grain, we should have an harmonious system, which would greatly facilitate many important calculations.

At present the terms *fluid ounce* and *fluid drachm* are anomalous names, for they are not measured by a Pharmacopœia ounce or drachm of any fluid. The adoption of my suggestions would make the fluid pound, fluid ounce, and fluid drachm to represent respectively a pound, an ounce, and a drachm of water.

Some discussion took place on Mr. Abraham's paper, in which, while the suggestions he offered were considered improvements on our present systems of weights and measures, the adoption by Parliament of a regular decimal system was considered advisable.

Dr. Edwards placed on the table a specimen of nitrate of cerium, which had lately been introduced by Dr. Simpson, of Edinburgh, as superior to the salts of silver and bismuth, in similar cases, as a sedative tonic.

Mr. Dutton said Dr. Simpson now recommended the oxalate of cerium as superior to the nitrate.

Mr. MERCER then read a paper on

THE DIFFERENT VARIETIES OF COD-LIVER OIL.

As there are three varieties of cod-liver oil recognized in our works on Materia Medica—brown, light brown, and pale—and considerable difference of opinion existing as to which kind was most beneficial and certain in its action, he considered that Pharmaceutists should, if possible, arrive at some decision on the subject, more especially since we could hardly take up a newspaper or magazine without seeing advertisements recommending "Light Brown Cod-Liver Oil" as the only kind on which dependence could be placed, or which ought to be used by the public. Though the historical notices of cod-liver oil are pretty numerous, and extend at irregular intervals over the last sixty years, most of our information is derived from the labours of De Jongh, who, a few years ago, paid considerable attention to the subject; and his analyses being quoted as the most correct which have yet been published, Mr. Mercer took them as the basis of his remarks.

The first question that arises is, What constitutes the distinction between the three varieties of oil referred to? De Jongh quotes several authorities on this point, and the conclusion he arrives at from their testimony is, that "the clear pale oil is obtained by the spontaneous flow from the putrescent livers, the brown by the boiling or roasting of the livers, and the light brown is a clear pale oil which has stood long on the livers, or has got old in the warehouse." The analyses of these three varieties may be referred to in Pereira's *Materia Medica*, page 2236, and it will be seen there is very little difference between them. They all contain about 96 per cent. of oleic and magaric acids, and glycerine, constituents of all oils and fats. The remaining 4 per cent. is made up by small portions of butyric and acetic acids, the elements of the bile, iodine, bromine, &c. And the conclusion De Jongh draws from these analyses is, that "The light brown and the pale oil agree in every respect much more than the brown; by which it is established that the light brown is only a pale oil which has become old." Proceeding in his investigations he tries their comparative medicinal value, and for this purpose selects three sets of six patients each, and much to Mr. Mercer's astonishment, he found that the palm of superiority was carried off, not by the light brown, which De Jongh now proclaims preferable to all others, but by the brown, obtained, as he tells us, by boiling or roasting the putrescent livers of the fish. This De Jongh accounts for by observing that according to his analyses, the brown oil contains a little more biliary matter and butyric acid than either of the others, it is therefore, he says, "fair to assume that the brown oil owes its greater power to the biliary matter and butyric acid, which exist in it in much larger proportions than in the lighter coloured oils." Yet, strange to say, by referring to his analyses, it will be seen that the pale brown oil he now recommends does not contain even a trace of butyric acid.

Altogether, De Jongh shows such a slight difference to exist between the chemical composition and medical effects of the three oils, that the question arises, Is it not possible that he may have failed in discovering their active principles? This Mr. Mercer believed to be the case; for while, according to his analyses, cod-liver oil has apparently a constitution similar to all other fats and oils, with the addition of biliary matter and small quantities of inorganic salts, Winckler, a German Chemist, has shown that, so far from this being the case, it possesses a chemical composition differing from all other fatty oils hitherto employed in medicine; a most important fact; for, previous to these investigations of Winckler, it was considered that all oils consisted of fatty acids in combination with glycerine, the oxide of glyceryle; but in cod-liver oil he finds that glycerine is replaced by the oxide of propyle. The generation of propylamine, which is met with in the normal urine and sweat, takes place only in cod-liver oil on the addition of ammonia, and in no other officinal fatty oil; and its place in the Materia Medica cannot therefore be supplied by any other oil.

(A Paper, by Winckler, on Cod Liver Oil, will be found in the *Pharmaceutical Journal*, vol. xii., folio 36.)

This discovery of Winckler's has not been questioned, and when we see that De Jongh failed to detect the presence of such an important substance as propyle, a characteristic which distinguished cod-liver oil from all other oils, we cannot place much confidence in the other results of his analysis.

With respect to the variety of oil which possesses the most valuable medicinal properties, the conclusion Mr. Mercer arrived at was, that the oil obtained from the

liver in a state most nearly approaching that in which it exists in the fish when alive, is the variety best adapted for medicinal use ; in short, the finest oil is that which is most devoid of colour, taste, and smell, three physical characters which are much more valuable tests than any chemical reactions we are acquainted with.

Dr. EDWARDS referred to some experiments mentioned by Dr. Inman in his lecture on Spontaneous Combustion, to the effect that cod-liver oil absorbed oxygen much more rapidly than any other oil, and he thought this might bear some relation to the fact that cod-liver oil contained propyle instead of glyceryle.

Mr. ABRAHAM said that nothing but very extended medical experience could decide which variety of oil was the best, but he thought it very advisable that the minds of the medical profession should be disabused of the idea that pale cod-liver oil was necessarily a bleached oil. Such was not the case, the oil, when obtained from fresh livers, at a low temperature, always being pale.

Mr. LAWSON observed, that some cod-liver oil, which he had exposed to the light for some time, lost its power of giving the usual liver oil reaction with sulphuric acid.

A vote of thanks having been passed to Mr. Abraham and Mr. Mercer for the papers they had read to the Society, Mr. Mercer exhibited and explained the patent Crimean candle-stove and lantern, made by Price's patent candle company, for the use of our soldiers in the Crimea.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

WE received, too late for insertion, the copy of the Report of the Meeting on January the 11th, of which an abstract was published last month.

PROFESSOR CHRISTISON'S TWO SUGGESTIONS RESPECTING COUNTER PRACTICE AND QUACK MEDICINES.

BY MR. GEORGE BURRELL.

I HAVE no doubt the general feeling of the Members of the Pharmaceutical Society, on reading Professor Christison's Address to the Edinburgh Branch, which appeared in a recent number of the Journal, was what I experienced myself—that of grateful respect. The talents and high position of the lecturer gave a weight and emphasis to his opinions deserving attention from all, but especially from Pharmaceutists, to whom the lecture was addressed.

The Professor's work on Materia Medica is our statute-book in this part of the world, and, therefore, any thing falling from him on his and our peculiar department, is properly regarded as conclusive.

This implicit reliance, however, I, for one, do not feel disposed to accord to him beyond the *scientific* part of his subject, for when he expresses an opinion on the *mercantile* part of it, I consider myself at liberty to canvass it by the light of my own experience and reflection—a right which, I believe, he would be the last to question.

In this spirit, therefore, I would draw the attention of the Society to two practical suggestions he offers towards our elevation, as a scientific body, namely, the *suppression* of *counter practice*, and the *discountenancing* the sale of *quack medicines*.

The first practice I consider utterly indefensible, and should be repudiated by every one who has any self-respect. Some, probably, may urge the plea of Shakspeare's starved apothecary, "that their poverty, not their will consents;" but the majority, I doubt, have not that to excuse them. So far as I know, very few in this country combine irregular medical practice with Pharmacy, and those who do, are generally found in obscure nooks, maintaining a kind of fungoid existence, by treating, or rather *mal*-treating obscene diseases. The probability is that this irregular practice acts—to use a railway phrase—as a "*feeder*" to the regular profession, for I suspect more patients are made in that way than are cured. This evil, I have no doubt, will soon succumb to the growing intelligence of our class.

The Professor's second suggestion, however, namely, giving up the sale of quack medicines, cannot be so summarily disposed of.

Quackery is a very subtile thing, and pervades every department of human knowledge. If the maxim *humanum est errari* be true, it will follow as a necessary consequence, that it is also *human to be gulled*. The dogma of the immaculate conception is as rank quackery as the assurance that so and so's pills will cure all diseases. So also is spirit-rapping, table-turning, &c., which delude the educated classes as infalli-

bly as the apocryphal cures of a nostrum gull and fleece the great unwashed. There is, in truth, a great deal of *educated* as well as *uneducated* ignorance in the world. Let any one vaunt his pomade or balsam as capable of making hair grow on the bald top of St. Paul's, and he will be astonished at the quantity he will sell. *We* have only to do with a particular phase of this universal principle; and I think it is taking rather a superficial view of the matter to suppose that by refusing to sell patent medicines, we shall put an end to the principle which engenders them. The trash would be merely diverted into other channels, and we would be precluded from exercising any control over it whatever. We are no more chargeable for the existence of quack medicines than we are for gonorrhœa or any other obscene diseases; and so long as there is a demand for patents, we shall have to supply them on the same principle that we supply balsam copaibæ, and its kind. The press is the foster-mother of all quackery, and so long as people read, and in their ignorance *believe* everything that appears in type, so long will the quack flourish. Besides, it is not fair to class all the patents under one category. Henry's Magnesia, Dixon's Pills, Singleton's Ointment, Poor Man's Friend, and such like, are admirable preparations, and have proved to be neither "dangerous" nor "*inert*." Even those which appeal directly to the gullibility of mankind, and the sale of which is estimated by unblushing falsehoods, are of a different character from the drastic compounds of former days, which led so frequently to coroners' inquests. If they do no good, they at all events avoid doing palpable harm. There is, however, one class of patent medicines which should be excluded from the stock of every lover of *decency*. I mean those vile nostrums which profess to cure what they mildly term "the indiscretion of youth." It is disgraceful to a large portion of the press of this country to admit the prurient advertisements of this class of quacks, who, I should think, are discarded foreign varlets profoundly versed in every kind of licentiousness. It is highly honourable to the *Times* and *North British Advertiser*, and a few other papers, to exclude these abominable advertisements, and I would strongly recommend every Member of the Society to discountenance them in every possible way. I never kept them myself; I would as soon take a share in a brothel. If the secret history of those who have fallen into the foils of these harpies were disclosed, it would reveal an amount of human misery which the most morbid imagination would shrink from conceiving. It would outdo the foulest "Mysteries" ever written. The unfortunate victim looks as if blighted by the Evil Eye, and the consumption of his body goes on simultaneously with that of his purse. I think I am justified in drawing a distinction between this class of patents and all others, because they are essentially *immoral*—suggesting by their advertisements and books, practices which result in the diseases they profess to cure.

The peculiar manifestation of quackery with which we have had to do can be uprooted only by the general increase of intelligence; and however pleasant it would be to see the large sum expended on patents diverted to our tills through the legitimate channels, I fear that when the time comes when the quack's occupation is gone, there will *not* be a corresponding increase in the consumption of legitimate physic. But while I consider it would be inexpedient at present to give up the sale of patent medicines, we are at the same time not required to encourage it. We may prevent our names from being attached to puffs and circulating bills—we may carefully abstain from recommending them, and avoid all other indirect ways of pushing sales. But that must be determined by each Member's particular circumstances; for it is not to be supposed that a country druggist, who is obliged to eke out a subsistence by selling many things not strictly professional, is in as favourable a position as his metropolitan brother to maintain the purity of his profession.

It is one of the evils of our present disorganized condition that the general experience of the Members cannot be brought to bear on any subject, and therefore no reform, however much called for, can be effected. I have since directed attention to the necessity of an effective local organisation as a means of knitting us more closely together, and of begetting an enlightened *esprit de corps*, and I am both surprised and disappointed that none of the leading Members in Edinburgh have taken up the matter. The Society in Scotland is a mere rope of sand; and so far as we in the provincial towns are concerned, it is not even *vox et preteria nihil*, for we do not hear the sound of each other's voices. Our respectable Secretary, Mr. Mackay, is most attentive in sending us invitations to meetings, lectures, &c., in Edinburgh, but which, unfortunately to most of us, are as impracticable as it would be to join a dinner party at the Antipodes.

ORIGINAL AND EXTRACTED ARTICLES.

EXAMINATION OF LOCOCK'S WAFERS.

BY MR. R. W. GILES.

I HAVE been lately requested by a Physician to examine Locock's wafers, with a view to determine the presence of morphia, which is not acknowledged as an ingredient, and the presence of which I even remember to have been denied in a letter from Da Silva and Co. to a lady in Clifton. The lozenges are artfully coloured with some matter which communicates a pink tinge to the solution obtained by treating them with water, and effectually obscures any reaction which might be hoped for on the addition of nitric acid. By digesting a few of the lozenges in ether, and subjecting the decanted liquor to spontaneous evaporation, feathery crystals of hydrochlorate (?) of morphia were obtained, which afforded the customary reactions with nitric acid and perchloride of iron. This method would be a convenient one for determining the quantity of morphia present, if such an investigation were desirable; but it is sufficient for pharmaceutists generally to be able to give a positive answer to the frequent inquiry whether they contain morphia, and to caution their customers against an unsuspicious employment of them.

ON SOME RARE KINDS OF CARDAMOM.

BY DANIEL HANBURY.

(*Concluded from page* 355.)

XANTHIOID CARDAMOM (FIG. 6, 7.)

Amomum with small round, brown-coloured fruits in clusters, No. 101 in W. Gomez's *Tavoy Catalogue*, 1827. MS. in the possession of the Linnean Society of London.

Amomum xanthioides, No. 1956.—Wallich, *Catalogus Plantarum quas in itinere Burmanico a mense Augusti*, 1826, *ad finem Maii* 1827, *observavit N. W.* MS. in the possession of the Linnean Society.

Amomum ? xanthioides.—Wall., *Catal. of the East Indian Herbarium*, No. 6557.

Among some specimens of drugs received from China through the kindness of my friend Mr. Lockhart, was a quantity of the capsules of a fruit resembling the *Hairy China Cardamom*,* but differing from it in the much more spiny character of the pericarp.

Upon comparison, it proved identical with a species collected at Tavoy, Gulf of Martaban, in 1827, by Mr. W. Gomez, in whose MS. collecting book (above quoted) it is defined as "*Amomum* (*with small round brown-coloured fruits in clusters*)."

In Dr. Wallich's MS. Catalogue of Burmese Plants (entitled as above) occurs the following, in the doctor's own hand:—

> "1956. *Amomum xanthioides*, Wall.—Very like *A. aculeatum*, Roxb., but differing seemingly in the linear-lanceolate not cordate leaves, and the fruit which consists in short, rounded clusters from the repent root; it is of an oblong obtuse form, thickly covered with prickles. Seems a tall species. Tavoy. $\frac{12}{8}$ 27."

The next notice of *Amomum xanthioides*, I find in the MS. Catalogue of the East Indian Herbarium of the Linnean Society, inserted thus:—

> "6557. Amomum ? xanthioides, Wall. (A. aculeato Roxb. prox.). Tavoy W.G."

From this last entry, it will be observed that a doubt seems to have been felt

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* Vide p. 354.

as to the genus of the plant in question, a doubt, I confess, that appears to me groundless, if *Amomum aculeatum* is an admitted *Amomum*.

The specimens of *Amomum xanthioides* collected by Gomez, and now in the collection of the Linnean Society, are without flowers, but well furnished with fruits, one bunch of which is represented in fig. 6. I have carefully compared this species with its near ally, *A. aculeatum*, as figured by Roxburgh,* and also with the specimen preserved in the herbarium of the British Museum. In addition to the observation of Dr. Wallich, that in *A. xanthioides* the leaves are linear-lanceolate, while in *A. aculeatum* they are cordate [-lanceolate], I may remark that *A. aculeatum* appears to be a *much more robust* species, with larger fruit; it has besides the spines upon the pericarp not simple, but flattened and partially united two or three together, a character very evident in the dried specimen, though not well represented in Roxburgh's figure.

Fig. 6.

Fruit of *Amomum xanthioides*, Wallich, from a specimen in the herbarium of the Linnean Society.

The capsules of *Amomum xanthioides*, received by me under the name 砂仁殼 *Sha-jin-kŏ*,† had been deprived of seeds; indeed, the terminal syllable in the Chinese name signifies *husk* or *shell*. Yet from a few capsules which had escaped the shelling process, I had an opportunity of examining the seeds which, I suspected, were not unknown in the English market. I believed them to constitute the Cardamom *Seeds* ‡ occasionally offered at the London drug sales, and which I had traced to Moulmein and Penang.

This opinion has been unexpectedly confirmed. While this notice was in the hands of the printer, I received through the kindness of R. Padday, Esq., of Singapore, three samples of "*Bastard Cardamoms*" obtained from Bangkok in Siam. These *Bastard Cardamoms* have mostly been deprived of the husk: the seeds are either detached, or united with the partitions into three-lobed masses. But the fruits retaining the husk are so evidently those of *Amomum xanthioides* that I have no hesitation in referring the *Bastard Cardamoms* to that species. I also identify them with the Cardamom *Seeds* of the London market.

The seeds of *A. xanthioides* much resemble those of the Malabar Cardamom,

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* *Asiatick Researches*, vol. xi., p. 344, pl. vi. Vide also *Flora Indica* (ed. Carey), vol. i., p. 40.

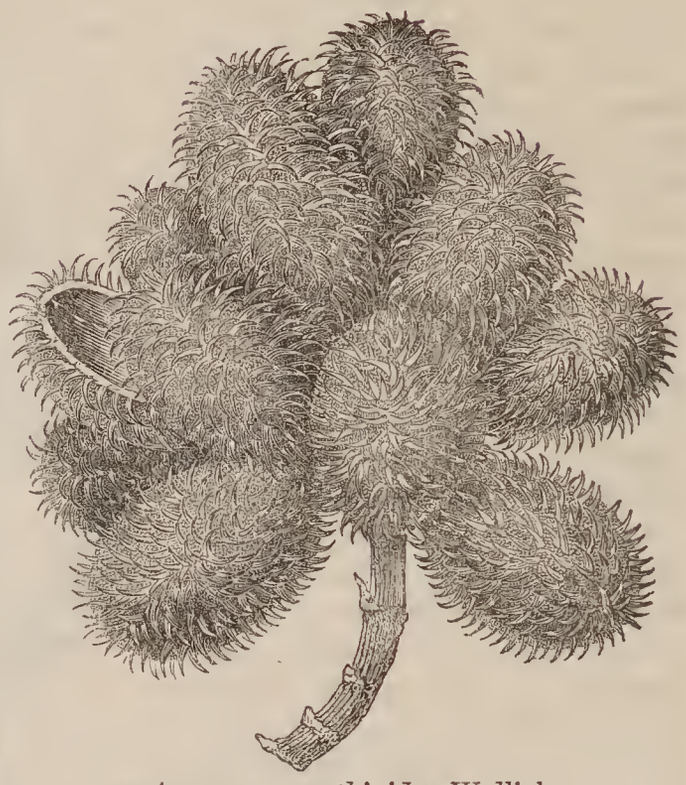
† I do not attach much value to this Chinese name, which I think is sometimes applied to the *Hairy China Cardamom*.

‡ I mean the seeds *per se*. Malabar Cardamoms deprived of pericarp are, I believe, never imported.

but are not so rugose: they are, however, distinguishable by their peculiar aromatic taste and smell.

The empty capsules received from China are mostly attached to a common stalk, which, when perfect, is about five inches long, and beset with the remains of sheathing bracts. The superior portion, which is much stouter than the rest, bears the fruits closely crowded together on short, bracted pedicels. No bunch in my possession bears more than twelve fruits, but from the number of pedicels on some specimens it would appear that the flowers at least are often twice as numerous. The capsules having been deprived of seeds are shrunken and compressed, but after soaking in boiling water they acquire their proper volume (fig. 7), becoming nearly spherical and about three-quarters of an inch in diameter. The pericarp is covered with long, acute, recurved spines, which are longest near the base.

Fig. 7.



Amomum xanthioides, Wallich.

I have received no information regarding the uses of these cardamom husks, which, it would appear, are exported to China and there consumed.

By a letter from Robert Hunter, Esq., of Bangkok, addressed to Mr. Padday, I learn that the so-called *Bastard Cardamons* are the produce of the Laos Country and of Cambodia, where they grow wild in the more elevated regions of the mountain forests. Their commercial value is small, those of the first quality being worth in Siam about 3½*d.* sterling per pound.

It would be very interesting to procure perfect specimens of this curious species of *Amomum*, from which a complete description might be drawn up.

BITTER-SEEDED CARDAMOM. (FIG. 8.)

Cardamome noir de Goertner.—Guibourt, *Hist. des Drogues*, éd. 3, tome ii. (1836), p. 287.

Black Cardamom—Gaertner.—Pereira, *Elem. of Mat. Med.*, part ii. (1840), p. 699.—*Elem. of Mat. Med.*, ed. 2, vol. ii. (1842), p. 1036, fig. 205.

Cardamome noir de Gœrtner.—Guibourt, *Hist. des Drogues*, éd. 4, tome ii. (1849), p. 214.

Black Cardamom.—Pereira, *Elem. of Mat. Med.*, ed. 3, vol. ii. (1850), p. 1140, fig. 259.

Cardamoma nigra; Schwarze Kardamomen.—Martiny, *Encyklopädie der Med. Pharm. Naturalien und Rohwaarenkunde*, Bd. ii. (1854), p. 775.

Cardamome à semences amères.—Guibourt MS.

益智子—*Yih-che-tsze.*

Very little is known of the origin of this cardamom. By Professor Guibourt, who first described it, it was doubtfully referred to the *Zingiber nigrum* of Gaertner, a plant identical with *Alpinia Allughas* of Roscoe, but as Dr. Pereira has pointed out* (and I can confirm his statement), it is totally different from

* *Elem. of Mat. Med.*, ed. 3, vol. ii., p. 1140.

the fruit of that species. In the *Pun-tsaou-kang-muh*, a celebrated Chinese herbal, there is a rude figure of the plant, which is stated to be indigenous to the island of Hai-nan. The MS. catalogue of the collection of Chinese drugs at the Royal College of Physicians of London, mentions the province of Kwantung as its place of growth. It is probable that both statements are correct.

For a specimen of this cardamom as met with in the drug-shops of China, I am indebted to the kindness of my friend Mr. Lockhart. The capsules are mostly oval, some ovate-oblong, and a few nearly spherical, pointed at the extremities, 6 to 10 lines long. The pericarp is of a deep dusky-brown, coriaceous, devoid of hairs, beset longitudinally with interrupted ridges usually about 18 in number; it has an agreeable aromatic smell and taste. The seeds are obtusely angular and adhere firmly together; they are distinguished by an aromatic, *bitter*, *myrrh-like* taste.

There is a fine specimen of this Cardamom in the Musée d'Histoire Naturelle at Paris.

Fig. 8.

Bitter-seeded Cardamom (fruits and seeds).

OVOID CHINA CARDAMOM (FIG. 9).

Amomum medium.—Loureiro, *Flora Cochinchinensis*, ed., Willd. (1793), tom. i., p. 5.

Cardamome ovoide de la Chine.—Guibourt, *Hist. des Drogues*, éd. 3, tome ii. (1836), p. 287.

Ovoid China Cardamom.—Pereira, *Elem. of Mat. Med.*, part ii. (1840), p. 698, fig. 132 ; *Elem. of Mat. Med.*, ed. 2, vol. ii. (1842), p. 1035, fig. 202.

Cardamome ovoide de la Chine.—Guibourt, *Hist. des Drogues*, éd. 4, tome ii. (1849), p. 215, fig. 116.

Ovoid China Cardamom (*Alpinia alba*, Roscoe).—Pereira, *Elem. of Mat. Med.*, ed. 3, vol. ii. (1850), p. 1141, fig. 260.

Cardamoma Chinensia oviformia ; Eiförmige Chinesische Kardamomen.—Martiny, *Encyklopädie der Med. Pharm. Naturalien und Rohwaarenkunde*, Bd. ii. (1854), p. 775.

草菓 *Tsaou-kwo.*

Professors Guibourt and Pereira have referred the *Ovoid China Cardamom* to *Amomum medium*, Loureiro ; and, as I think, with good reason ; but of the identity of this plant with *Alpinia alba*, Roscoe, the evidence, although generally admitted, is far from conclusive. Loureiro's description is incomplete; he did not see fresh flowers of his *Amomum medium*, no specimen of it exists in his herbarium, nor has a drawing of it been preserved. Moreover, Roscoe, in enumerating the synonyms of his *Alpinia alba*, has taken no notice of Loureiro's *Amomum*.*

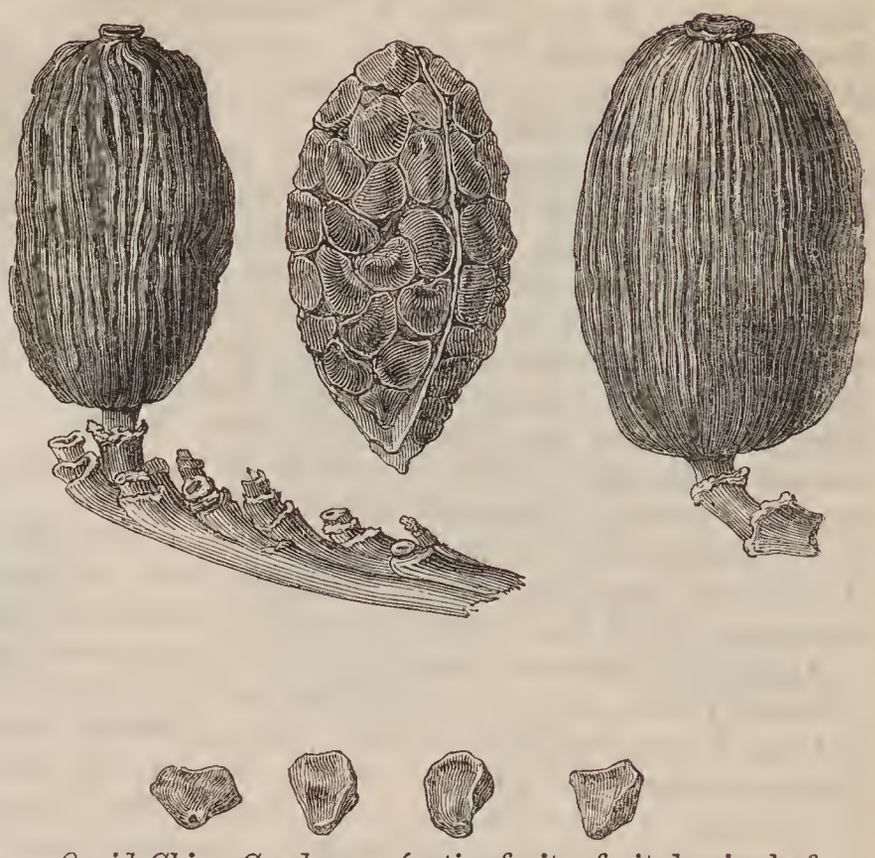
But *Alpinia alba* is itself a plant known only by description ; no figure of it is to be found, still less a specimen. I am assured by Sir W. J. Hooker it is

* *Linn. Trans.*, vol. viii., p. 346.

noticed in none of the Indian Flora, and that it does not occur in any of the catalogues of plants cultivated in India.

The *Ovoid China Cardamom* is a product of Southern China, and abundant in the drug shops of Singapore, as well as in those of China. It is an oval or oblong, three-celled, three-valved and obscurely three-sided fruit, of from 1 to 1¾ inches in length. The pericarp is of a dusky-greyish brown deep striated longitudinally, thick and coriaceous, frequently covered on the surface with a whitish efflorescence; it is but slightly aromatic. The seeds are very large, often upwards of three lines in length, sharply angular and striated, having a powerful and peculiar aromatic smell and taste.

Fig. 9.



Ovoid China Cardamom (entire fruits, fruit deprived of pericarp, and seeds).

This cardamom is remarkable for its large, hard, angular seeds, which alone seem sufficient to prove its distinctness from the *Languas vulgare* of Kœnig, whose seeds are described in the *Observationes Botanicæ* of Retzius (*Fasc.* iii., p. 64, 5) as "*Cardamomo minori simillima.*"

The seeds of the *Ovoid China Cardamom* are used by the Chinese for a variety of disorders, and, according to Loureiro, are also employed as a condiment.

There are examples of the *Ovoid China Cardamom* in Dr. Burges's collection at the Royal College of Physicians, under the erroneous designation "*Grana Paradisi in capsulis.*"

At the Musée d'Histoire Naturelle at Paris, I have observed a specimen of the same fruit, labelled *Quâ-leu.*

GALANGA CARDAMOM. (FIG. 10, 11.)

高良薑子 *Kaou-leang-keang-tsze.*

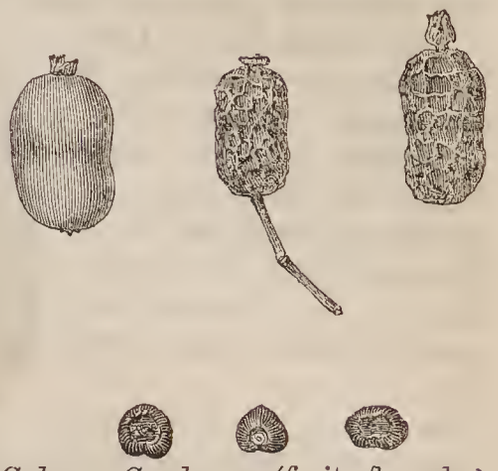
紅豆蔻 *Hung-tow-kow.*

I have applied the term *Galanga Cardamom* to a small medicinal fruit received under the above Chinese names from my friend Mr. Lockhart, of Shanghae.

The specimen consists of capsules about half an inch in length and three lines in breadth, of an oblong form, somewhat constricted in the middle, or occasionally pear-shaped; some are obscurely three-sided. Each fruit is prominently crowned with the remains of the calyx; in a few, the lower extremity is still attached to a slender pedicel. Most of the capsules are much shrivelled on the outside, apparently from having been gathered while immature (fig. 11); a few, however, retain a plump and smooth appearance (fig.

10). The pericarp varies externally in colour (according to its maturity?), from a pale to a deep reddish-brown; internally it is whitish. It is glabrous in the mature fruits, thin and brittle, not splitting into valves; in the shrivelled fruits it appears stronger, from its close adherence to the mass of seeds. Upon removal of the pericarp the seeds are seen united in a three-lobed mass, completely invested in a whitish integument, each cell or lobe containing, usually, two seeds, placed one above the other. The seeds are ash-coloured, flattish and somewhat three-cornered; finely striated externally towards a large conspicuous *hilum* which faces the wall of the capsule, and which is connected with the axillary placenta by a long, broad *funiculus*. Each seed is nearly surrounded by a tough aril; opposite the *hilum* a scar-like depression is observable. The seeds have a pungent, burning taste and aroma resembling the *Larger Galangal Root*; the pericarp is similarly aromatic and biting.

Fig. 10. Fig. 11.



Galanga Cardamom (fruits & seeds.)

Although I have not data for determining *with certainty* from what plant the *Galanga Cardamom* is derived, I am induced, after a careful examination, to refer it to the Great Galangal, *Alpinia Galanga*, Willd. (*Amomum Galanga*, Loureiro; *Lancquas*, Rumphius.) I do so, because—1. The name *Kaou-leang-keang** (*Cào Leâm Kiām* of Loureiro) or *Leang-keang* is the Chinese name of *Alpinia Galanga*. 2. The fruit in question substantially agrees with the descriptions of Rumphius,† Loureiro,‡ and especially of Roxburgh.§

I have examined several specimens of *Alpinia Galanga* in the herbarium of Sir W. J. Hooker; none, however, in fruit. The figures of the plant, also, with the exception of a very poor one in the *Herbarium Amboinense*, do not represent the fruit.‖

It is from *A. Galanga* that the *Greater* or *Java Galangal* root is derived. It still remains to be ascertained to what plant we owe the *Smaller* or *Chinese Galangal*, the ordinary *Radix Galangæ* of European druggists.

According to Loureiro, the seeds of *Amomum Galanga* are calefacient, alterative, stomachic, sternutatory, beneficial in pituitous colic, diarrhœa, vomiting, and hiccough. The root, he states in the MS. before referred to, appears to be *Galangal*.

I have observed a specimen of the *Galanga Cardamom* in the cabinet of the Royal College of Physicians of London.

There is yet another species of cardamom abundant in the markets of the East, which though now seldom seen in Europe, except in cabinets of *Materia Medica*, is described by all the older, and by many of the modern, writers on pharmacology. I mean the *Round* or *Cluster Cardamom*, the fruit of *Amomum*

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* The syllable *tsze* merely signifies *seed* or *fruit*.

† *Herbarium Amboinense*, lib. 8, c. 9, p. 144.

‡ *Flora Cochinchinensis* (ed. Willd.), t. i., p. 7. I am aware that Loureiro here describes the fruit as *trivalvis*, but in an earlier description of *Amomum Galanga*, communicated by Loureiro himself to Sir Joseph Banks, this word is omitted. It was with much interest that I discovered this description of *A. Galanga* in a little MS. volume in the handwriting of Loureiro, preserved in the British Museum. The volume, which is the MS. No. 93, *Catal. Biblioth.*, tome iii., p. 35, is thus entitled :—*Nova Genera Plantarum in Cochinchinâ sponte nascentia descripta juxta methodum clar. Linnæi; simulque cum veris plantis missa in Angliam a Botanophilo Joanne de Loureyro. An.* 1773. The specimen of *A. Galanga* is unfortunately not now to be found.

§ *Asiatick Researches*, vol. xi. (1810), p. 318. *Flora Indica* (ed. Carey), vol. i., p. 59, 61.

‖ Nees v. Esenbeck. *Plant. Med.*, pl. 67, 68. There is also a beautiful coloured drawing, marked *Amomum Galanga*, No. 1302 (unfortunately not representing the fruit), among the unpublished drawings of Dr. Roxburgh, in the possession of the Hon E. I. Company.

Cardamomum of Linnæus, a plant occurring in Sumatra and other parts of the Archipelago as well as on the adjacent continent. Of this drug, Mr. Padday has kindly sent me three samples obtained at Bangkok by Mr. Hunter. The finest sample, marked No. 1, is the produce of Cambodia, and worth in Siam about 5*s.* sterling per lb. Samples No. 2 and 3 are from Chantibon (Siam) and marked respectively 4*s.* 6*d.* and 2*s.* 3*d.* per lb. Mr. Hunter states that this cardamom grows without cultivation on the lower slopes of the mountains.

The *Round* or *Cluster Cardamom* is in common use in China, whence I have repeatedly received it under various designations, as *Hang-kow*, *Seaou-kow*, *Po-tow-kow;* for the last name, which is perhaps the same as that quoted by Loureiro, the characters are

THE LONDON PHARMACOPŒIA & PHILLIPS'S TRANSLATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—The last number of the *Pharmaceutical Journal* contains a report of some observations which I took the liberty of making at the January meeting of the Pharmaceutical Society, in explanation of a statement in the Preface of the London Pharmacopœia, which appears to be misunderstood.

The passage to which I alluded, after calling attention to the fact that many medicinal substances have been removed in the present edition from the second to the first part of the work, because they are so well prepared by the manufacturing chemist that it is unnecessary to do more than enumerate and describe them, proceeds to mention the motives which have induced the College to retain the mode of preparing others, such as the chloride and bichloride of mercury, notwithstanding these are prepared by the manufacturing chemist with no less care than the articles which have been removed; and then adds, "But although we have bestowed the utmost care and attention in our power on the accurate preparation of these (the chloride and bichloride) and *some other* (*alia quævis*) articles, we have no doubt that skilful chemists may find it possible to prepare the same by less expensive or more convenient processes." The concluding remark that all that is required of "these preparations of others," that is, made by processes differing from the officinal one, is that they shall bear examination by the same tests which are ordered to determine the purity of the officinal preparations, points out the class of medicines to which these remarks are intended to apply, of which the chloride and bichloride of mercury are given as examples.

The report, by putting into my mouth the translation of Mr. Phillips, has made my explanation less clear than I intended. *All our other preparations* is far more comprehensive than the original *alia quævis*, and may, notwithstanding the context, have encouraged the idea that the mode of forming the *vegetable* preparations may also be varied, *provided the result in the opinion of the operator is the same.* I will not prolong this communication by insisting on the importance of aiming not only at goodness but at *uniformity* of preparations, and on the dangerous tendency of the latitude which some Pharmaceutists have thought desirable; but I wish it to be clearly understood that the College is not answerable for the accuracy of Mr. Phillips's translation. Having been in constant communication with Mr. Phillips during the preparation of the Pharmacopœia, I know that he was anxious to make his work as accurate as it is valuable, but it must not be considered as the *ipsissimo verba* of the College.

With respect to the "*insufficiency in some cases*" of the Pharmacopœia tests, I expressly alluded at the time to the tests for the alkaloids, which are scanty, and in the case of atropia are stated to be unknown. The remark, however, was called forth by a statement that an adulterated or spurious oxide of zinc,

lately, as I understood, met with in the shops, answered the Pharmacopœia tests for the genuine oxide. The Pharmacopœia tests were prepared, some with a view to determine the nature, others the purity of the article, according as either object appeared desirable. The tests which accomplish the latter object might be multiplied to any extent, but the nature of the work necessarily limits them to the detection of those adulterations which are most important or most likely to occur. *New* adulterations may at any time require new tests. Although, therefore, the tests are in some cases, as the alkaloids, imperfect, and in others insufficient to detect all the adulterations that are, *or may at any future time*, be practised, they are probably with few exceptions nearly as comprehensive as is desirable.

I am, Sir, yours, &c.

FREDERIC J. FARRE, M.D.

7, *Montague Street, Russell Square, Feb.* 13, 1855.

COMPOUND COLOCYNTH PILL, P.L. 1851.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—In the January Journal Mr. Southall, in allusion to the Compound Colocynth Pill of the Pharmacopœia, makes the following remarks :—"Scammony is a mild medicine, producing no sensible effect except in considerable doses, and from the very small proportion in which it is directed to be used, as well as from the impurities of the average quality of scammony, I am doubtful if its effects in the compound extract are generally appreciable, and I believe it might be wholly omitted without attracting the notice of the medical prescriber or his patients."

In these views Mr. Southall is at issue with those eminent writers on Materia Medica, the late Drs. Pereira and A. Todd Thomson, the former ranking scammony amongst the most potent purgatives we possess; remarking, that few persons are aware of the potency of the genuine drug, the activity of which depends on the resinous portion. He suggested that the resin be obtained by means of spirit, and the inert matter thus disengaged. In this view I entirely concur, and believing the efficacy of the compound colocynth pill to depend mainly on the quality of the scammony employed, would suggest that the resin only be used. This would go far to obviate the inconvenience attendant upon the various qualities of scammony—the price ranges from 12*s.* to 42*s.* per lb. I can quite understand that the low price samples are nearly useless; containing probably from 70 to 80 per cent. of impurity; whereas the higher priced article contains usually from 75 to 80 per cent. of the pure resin. I have always used the best scammony I could obtain, the price of which has been 40*s.* or 42*s.* per lb. For some years past I have prepared the compound colocynth pill as follows, and have never had a complaint; but, on the contrary, have not unfrequently received commendation both from medical practitioners and patients.

Make the simple extract of colocynth according to the Pharmacopœia, and carefully evaporate to dryness, towards the close of the operation spontaneously, then powder it.

℞ Pulv. Ext. Coloc. Simp., ℥ij.
" Ext. Aloes, ℥xij.
" Scammoniæ, ℥iv.
" Cardam. Decort., ℥j.
" Sapon. Duri, ℥iij.

Mix, and keep in a stoppered bottle.

This powder may be rendered of pill consistence by the addition of a little water, about three or four drops of water being sufficient to make up a drachm. The advantages of this form of pill are—it may be readily mixed with any soft

extract giving it consistency; it is not liable to get hard by keeping, and the pills made from it keep their form; whereas pills made from the Pharmacopœia preparation are generally any shape but the right one.

It will be perceived that the quantities used of all the ingredients are the same as ordered in the Pharmacopœia, the only difference being in the use of the simple extract of colocynth in *powder*, and the substitution of hard for soft soap.

I am, Sir, yours respectfully,

Jno. R. Collins.

Haverstock Hill, near the Toll Bar, January 25th, 1854.

ON THE LAWS AND CUSTOMS REGULATING PHARMACY IN FRANCE.

BY MR. HOWARD HOPLEY.

(*Continued from page* 283.)

The new modifications of the law of 1803, which were enacted last August, came into operation on the 1st of January of this year; but the Pharmaciens of Paris were much displeased at the change, and petitioned Government for its repeal. They wrote lengthy articles on the subject in the different medical journals, explaining how disadvantageous the alteration would prove to the public at large, and how injurious to their body; they also reasoned forcibly with the high medical powers, beseeching them to use their influence in removing so objectionable an Act, and bringing into operation one more in accordance with their views and the requirements of the public. In fact, by dint of unity and perseverance, they have produced the desired effect, and some modifications of the new law have received the sanction of the Legislature.

The Pharmaciens of Paris are a very sensitive race; acutely aware of the important part they perform in the social system, they will bear no trifling with, nor allow intruders to enter within their sacred province. The powers that be treat them with the greatest respect, and acknowledge their claims when a proper appeal is made by their united body.

It must not be supposed, however, that they have gained all that they desired. It was the object of their ambition to be placed in the same position as the Apothecaries in Germany, who are by law limited in number, and protected by a tariff of prices, which secures to them a fair remuneration for their skill and services. Unless they (the Pharmaciens) could obtain these advantages, they declared that they would rather be free from legislative restrictions, like the Chemists in England, than subjected to the obnoxious provisions of the new law of August, 1854.

By placing the principal modifications of August, 1854, in opposition to those parts of the old law to which they relate, the difference will be manifest, and the grounds of complaint understood.

Law of the 21st Germinal, Year 11. (11 April, 1803.)	Modifications. 26th August, 1854.
Pharmacien 1st Class.	Pharmacien 1st Class.
Obligation to produce Diploma of Bachelor of Letters.	Obligation to produce Diploma of Bachelor of Science. (A higher grade.)
To certify eight years of "Stage" (Dispensing behind the counter) in case of passing the examination without studying in the Schools.	To study in the Schools for at least three years.

By studying in the Schools, each year would count for two of Dispensing, thus four years of Dispensing, with two in a superior School, would form the complement of eight years.	To certify three years of Dispensing and three in a superior School.
Could practise Pharmacy in any part of France.	Can practise Pharmacy in any part of France.
Pharmacien 2nd Class.	Pharmacien 2nd Class.
Obligation to certify Diploma of Bachelor of Letters.	Not required.
No obligation to study in a School —eight years of Dispensing being sufficient.	Obligation to study one year in a superior, or a year and half in a secondary School, besides six years of Dispensing.
Might be examined and received by the Juries chosen in each department from the principal Pharmaciens of the chief town.	The Juries are suppressed. All Examinations must be conducted by the Schools.
Must have attained twenty-five years of age.	Not obligatory.
Could exercise the profession only in the department chosen, the departments of Paris, Strasburg, and Montpelier, excepted—no second-class Pharmacien being allowed in those parts.	Can exercise in any one singly of the departments of France—Paris, Montpelier, Strasburg, included.

Among the greatest subjects of complaint was this last proposition, which allows a second class Pharmacien to practise in Paris. On examining the above it will be seen that the tendency of these modifications would be to increase the number of second class Pharmaciens, and even almost to extinguish the superior class. The cost of the Bachelorship of Sciences, which must be certified before taking the first inscription, together with the cost of the schools and dispensing, and then the diploma, would be so great, that with the insignificant advantages obtained, few would care to submit to it.

Perhaps I could not do better than quote a few of the arguments used by the Société de Prévoyance des Pharmaciens, department of the Seine, in their address to the Minister of Public Instruction; they seem forcible, and have evidently had great weight with the Government.

"It is very evident," says the Council, "that this decree is intended to increase the revenues of the superior schools of Pharmacy, by obliging aspirants to follow the course of these schools. But will this end be accomplished? We think not; and in examining the terms of the decree we shall be able to prove that it will have a contrary effect. The schools give (only for the departments comprised in their jurisdiction) certificates of the second class; from this it results necessarily that the recipients will have the right of following their profession in whichever department they may have chosen. And thus the privilege accorded to Pharmaciens of the first class by the law of Germinal, is abolished. Then why have we Pharmaciens of the first class? What is their utility? What advantages will they possess to compensate them for the enormous sacrifices that the decree imposes on their families, and the difficulties which surround the possession of a first class diploma?

"For to obtain this, students must present their certificates of Bachelor of

Science before taking their first inscription—must remain three years a charge to their families to follow the course of a school—must pay 150 francs for conferences, &c., 1390 francs for their diploma, submit to numerous examinations, and all for the sake of obtaining a parchment conferring the title of First-class Pharmacien, without one advantage attached to that title except the power of moving an establishment from one part of the empire to another, which Pharmaciens are not in the habit of doing.

"What will be the effects of this decree? The almost absolute suppression of First-class Pharmaciens; for, with the exception of those who aim at a Professorship, no student in Pharmacy will submit to the rigorous exactions of this law, to obtain the power of opening an establishment in Paris, for example, when he can with such facility obtain a diploma of the second class.

"To be a Pharmacien, second class, it will suffice to certify six years of Dispensing, four inscriptions (one year) in a superior school of Pharmacy, or six inscriptions (one year and a half) in a secondary school.

"Here we cannot forget a singular anomaly in the conditions imposed upon students for the first or second class. It is acknowledged that the most important feature of our art is manipulation; by it the reputation of the Berals, the Soubeirans, has been established, they whom Pharmacy in good right considers her most skilful practitioners. And it is that useful class which is placed in the second rank, whilst the knowledge, purely theoretical, professed in the superior schools, is considered most necessary to Pharmaciens of the first class, so that these will be learned theoreticians, those clever manipulators. Which of the two classes will be the better Pharmaciens. As to us, we who know how to appreciate the one and the other, should not hesitate to give the precedence to that student who, with a sufficient knowledge of theory, joins an incontestable superiority in the manipulation of Pharmaceutical preparations; for we cannot forget that Pharmacy is, before all, the art of preparing medicines.

"We believe that the Candidates for the first as well as the second class should pass at least four years of Dispensing in an establishment, to acquire that amount of knowledge and practice which is necessary.

"We consider, therefore, that in reducing this period of Dispensing to three years the decree has sacrificed too much the interests of the public to the augmentation of the revenues of the superior schools.

"Another thing appears very strange; it is the suppression of all guarantees of general knowlege for the second-class diploma, as well as of the requirement that the age should be twenty-five years.

"How is this! Young men, twenty years of age, without literary knowledge, without preliminary studies so essential, and even indispensable to a Pharmacien, preparing the formulæ of Physicians who write in Latin, and that even in great cities, by the side of their brethren of the first class, and in competition with them.

"That which justifies the confidence of the public in a Pharmacien is that he is known, before having taken his diploma, to have given proofs of his study and knowledge in almost all the branches of literary and scientific education; and this law suppresses preliminary studies.

"How can one believe that in presence of so great facilities accorded to Pharmaciens of the second class, young men will submit to six years of preparatory studies, which will cost their families 15,000 francs, to obtain the Bachelorship of Science, then to undergo numerous examinations and special courses, to have at the age of twenty-five years a title which will cost 1540 francs, and which will give them no privilege except that of being able to write over their door, 'Pharmacien, First Class,' whilst their neighbour, who writes nothing, will be accounted by the public the more modest of the two.

"It would be an illusion to suppose that this title would give them the preference in the eyes of the world; for the number of Herborists who are yearly punished for practising Pharmacy, clearly proves it is not always knowledge which the public seek."

After so lengthened an extract, I will only just remark that the appeal has produced its effect, and the great cause of complaint, namely, the power of receiving second class Pharmaciens in the departments of Paris, Strasburg, and Montpelier, is suppressed. There are one or two other changes, but too insignificant to mention, and the Pharmaciens of Paris are once more in a state of tranquillity.

OLEUM MORRHUÆ CUM QUINA—COD-LIVER OIL WITH QUININE.

BY MR. WM. BASTICK.

At a recent meeting of the Medical Society of London, held January 27th, Mr. Bastick described the mode of preparing a solution of quinine in cod-liver oil, which he has brought under the notice of medical men. The solution is effected by adding anhydrous quinine, in fine powder, to the oil contained in a suitable vessel, and applying the heat of a water-bath until a clear solution is formed. The oil acquires a darker colour as the quinine dissolves. The quantity of quinine may be varied according to the wish of the prescriber, but the proportions which have been proposed are two grains to the ounce. It is essential that the quinine should be anhydrous, in which state it may be obtained by precipitating the quinine with ammonia from a solution of the sulphate, washing and drying this precipitate, and fusing it in a little porcelain dish.

ON THE USE OF COFFEE LEAVES IN SUMATRA.

*(Extract of a Letter from James Motley, Esq., to Sir W. J. Hooker.)**

In going up the river Chenaku [Sumatra] I saw everywhere coffee planted about the houses, and in every case the fruit dropping and decaying on the ground. Upon inquiring I found these people drank an infusion of the leaves and entirely neglected the berries. I was very anxious to taste this and see it prepared, and luckily had an opportunity of doing so. A number of young twigs of the plant were gathered with their leaves, and after being cut to about a foot in length, were placed closely together between two strips of bamboo, tied at the ends, so as to form a dense disc of green leaves about eighteen to twenty inches in diameter. This was then held over a clear blazing fire (the ends of the bamboo serving for a handle), until the leaves were of a rich brownish-green colour and perfectly crisp and brittle. The latter part of this process requires some care, as, when nearly dry, the leaves are almost as inflammable as gunpowder, and if once they catch the flame, the whole is consumed in a moment. When dry, the leaves are pounded by crushing in the hand to the state of the specimen sent you, which I got prepared for your Museum before my eyes. The powder of the leaves is infused in boiling water, exactly like tea, though in much larger quantities; it produces a dark brown liquid, looking like coffee, smelling like green tea, and certainly tasting very much like a mixture of the two. It is very pleasant however, and refreshing after a hard day in the sun, and I can understand these people being passionately fond of it, as they certainly are. The curious part of it is, that while theine, caffeine, and theobromine have been found (nearly identical as they are in composition and properties) in use in three distinct parts of the world, and valued for the same exhilarating qualities, here is a people, little raised above savages, using also in an independent manner one of these very plants, being evidently uninstructed, as otherwise they would certainly have used the berry as their teachers did, finding out for themselves its qualities and uses.

ROYAL INSTITUTION.

The Friday evening meetings of the Members of the Royal Institution commenced for the ensuing season on the 19th of January. As usual, Professor Faraday was the Lecturer on this, the first, evening, and, as a natural consequence, the Theatre was thronged with a distinguished audience. The subject was—

"ON SOME POINTS OF MAGNETIC PHILOSOPHY."

The following is the summary of the lecture, which has been printed for circulation among the Members of the Institution:—

The magnetic and electric forms of power being dual in their character, and also able to act at a distance, will probably aid greatly in the development of the nature of physical force, generally, and if (as I believe) the qualities are essential to the forces, are always equal and equivalent to each other, and are so mutually dependent,

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* *Hooker's Journal of Botany and Kew Gardens Miscellany* for Feb., 1855, p. 41.

that one cannot appear, or even exist, without the other, the proof of the truth of such conditions would lead to many consequences of the highest importance to the philosophy of force generally. A few brief experiments with the electric power quickly place the dual cases before the contemplative mind. Thus, if a metallic vessel, as an ice-pail, be insulated and connected with a delicate gold leaf electrometer, or other like instrument, and then an insulated metallic globe, half the diameter of the ice-pail, be charged with positive electricity and placed in the middle of the pail, the latter being for the moment uninsulated by a touch outside, and then left insulated again, the whole system will show no signs of electricity externally, nor will the electrometer be affected; but a carrier applied to the ball within the vessel will bring away from it positive electricity, showing its particular state of charge; or being applied to the lower inside surface of the vessel will bring away negative electricity, proving that it has the contrary state; or the duality may be proved by withdrawing the ball, when the vessel will show itself negative by the electrometer, and the ball will be found positive. That these dualities are equal is further shown by replacing the ball within the vessel, observing the electrometer, bringing the ball and vessel in contact, and again observing the electrometer, which will remain unchanged; and, finally, withdrawing the ball, which comes away perfectly discharged, and leaves the vessel externally in its unchanged and previous state. So the electric dualities are equal, equivalent, and mutually sustained. To show that one cannot exist alone, insulate the metallic vessel, charge it strongly by contact with the machine or a Leyden jar, and then dip the insulated ball into it; and after touching the bottom of the vessel with the ball, remove it, without touching the sides; it will be found absolutely free from charge, whatever its previous state may have been; for none but a single state can exist at the bottom of such a metallic vessel; and a single state, *i.e.* an unrelated duality, cannot exist alone.

The correspondent dualities, *i.e.* the northness and the southness, of the magnetic force are well known. For the purpose of insulating, if possible, one of these, and separating it in any degree from the other, numerous experiments have been made. Thus six equal electro-magnets, formed of square bars, were put together in the direction of three lines perpendicular to each other, so that their inner ends, being all alike in polarity, might enclose a cubical space and produce an experimental chamber. When excited, these magnets were very powerful in the outer direction, as was found by nails, filings, spirals, and needles; but within the chamber, walled in on every side by intense north poles, there was no power of any kind; filings were not arranged; small needles not affected, except as they by their own inducing powers caused arrangement of the force within; revolving wire helices produced no currents; the chamber was a place of no magnetic action. Ordinary magnetic poles of like nature produced corresponding results. A single pole presented its usual character, attracting iron, repelling bismuth; a like pole, at right angles to it, formed a re-entering angle, and there a weak place of magnetic action was caused; iron was attracted from it to the prominent corners, bismuth moved up into it, and a third like pole on the opposite side made the place of weak force still weaker and larger; another pole or two made it very weak; six poles brought it to the condition above described. Even four poles, put with their longer edges together, produced a lengthened chamber with two entrances; and a little needle being carried in at either entrance, passed rapidly through spaces of weaker and weaker force, and found a part in the middle where magnetic action was not sensible.

Other very interesting results were obtained by making chambers in the polar extremities of electro-magnets. A cylinder magnet, whose core was 1.5 inches in diameter, had a concentric cylindrical chamber formed in the end, 0.7 in diameter, and 1.3 inches deep. When iron filings were brought near this excited pole, they clung around the outside, but none entered the cavity, except a very few near the outer edge. When they were purposely placed inside on a card they were quite indifferent to the excited pole, except that those near the mouth of the chamber moved out and were attracted to the outer edges. A piece of soft iron at the end of a copper wire was strongly attracted by the outer parts of the pole, but unaffected within. When the chamber was filled with iron filings and inverted, the magnet being excited, all those from the bottom and interior of the chamber fell out, many, however, being caught up by the outer parts of the pole. If pieces of iron, successively increasing from the size of a filing to a nail, a spike, and so on to a

long bar, were brought into contact with the same point at the bottom of the inverted chamber, though the filing could not be held by attraction, nor the smaller pieces of iron, yet as soon as those were employed which reached to the level of the chamber mouth, or beyond it, attraction manifested itself; and with the larger pieces it rose so high that a bar of some pounds weight could be held against the very spot that was not sufficient to retain an iron filing.

These and many other results prove experimentally that the magnetic dualities cannot appear alone; and that when they are developed they are in equal proportions and essentially connected. For if not essentially connected, how could a magnet exist alone? Its power, evident when other magnets, or iron, or bismuth is near it, must, upon their removal, then take up some *other form*, or exist *without action;* the first has never been shown or even suspected ; the second is an impossibility, being inconsistent with the conservation of force. But if the dualities of a single magnet are thrown upon each other, and so become mutually related, is that in right lines through the magnet, or in curved lines through the space around? That it is not in right lines through the magnet (it being a straight bar or sphere) is shown by this, that the proper means, as a helix round the magnet, shows that the *internal* disposition of the force (coercitive or other) is not affected when the magnet is exerting its power on other magnets, or when left to itself (*Experimental Researches*, 3119, 3121, 3215, &c.); and like means show that the *external* disposition of the force is so affected; so that the force in right lines though the magnet does not change under the circumstances, whilst the force in external (and necessarily) curved lines does.

The polarity of bismuth or phosphorus in the magnetic field is one point amongst many others essentially dependent upon, and highly illustrative of the nature of the magnetic force. The assumption that they have a polarity the reverse of that of para-magnetic bodies involves the consequence, that northness does not always repel northness or attract southness; or else leads to the assumption that there are two northnesses and two southnesses, and that these sometimes associate in pairs one way, and at other times in the contrary way. But leaving the assumptions and reverting to experiment, it was hoped that a forcible imitation of the imagined state of bismuth in the magnetic field might illustrate its real state, and for this purpose recourse was had to the indications given by a moving conductor. Four spheres of copper, iron, bismuth, and hard steel have been prepared and rotated upon an axis coincident with the magnetic axis of a powerful horse-shoe magnet; each sphere has a ring of copper fixed on it as an equator, and the ends of a galvanometer wire were brought into contact with the axis and the equator of the revolving globe. Under these circumstances the electric current produced in the moving globe was conveyed to the galvanometer and became the indicator of the magnetic polarity of the spheres; the direction of rotation and the poles of the magnet being in all cases the same. When the copper sphere, as a standard, was revolved, deflection at the galvanometer occurred in a certain direction. When the iron sphere replaced the copper and was revolved, the deflection at the galvanometer was the same. When the bismuth sphere was employed the deflection was still the same; and it still remained the same when the steel sphere was rotated in the magnetic field. Hence, by this effect, which I believe to be a truthful and unvarying indication of polarity, the state of all the spheres was the same, and, therefore, the polarity of the magnetic force in the iron, copper, and bismuth, in every case alike. (*Exp. Res.* 3164, &c.) The steel sphere was then magnetized in the direction of its axis, and was found to be so hard as to retain its own magnetic state when in a reverse direction between the poles of the dominant magnet, for upon its removal its magnetism remained unchanged. Experiments were then made in a selected position, where the dominant magnetic force was not too strong—(a magnet able to lift 430 lb. was used)—and it was found that when the steel magnet was placed in accordance, *i.e.* with its north pole opposite the south pole of the dominant magnet, the deflection was in the same direction as with the bismuth sphere; but when it was changed so as to be in the magnetic condition assigned by some to bismuth (*i.e.* with reversed polarities), it then differed from bismuth, producing the contrary deflection. For a further account of these considerations and investigations a paper may be referred to which will appear in the February number of the *Philosophical Magazine.*

It is, probably, of great importance that our thoughts should be stirred up at this time to a reconsideration of the general nature of physical force, and especially to

those forms of it which are concerned in actions at a distance. These are, by the dual powers, connected very intimately with those which occur at insensible distances; and it is to be expected that the progress which physical science has made in latter times will enable us to approach this deep and difficult subject with far more advantage than any possessed by philosophers at former periods. At present we are accustomed to admit action at sensible distances, as of one magnet upon another, or of the sun upon the earth, as if such admission were itself a perfect answer to any inquiry into the nature of the physical means which cause distant bodies to affect each other; and the man who hesitates to admit the sufficiency of the answer, or of the assumption on which it rests, and asks for a more satisfactory account, runs some risk of appearing ridiculous or ignorant before the world of science. Yet Newton, who did more than any other man in demonstrating the law of action of distant bodies, including amongst such the sun and Saturn, which are 900 millions of miles apart, did not leave the subject without recording his well-considered judgment, that the mere attraction of distant portions of matter was not a sufficient or satisfactory thought for a philosopher. That gravity should be innate, inherent, and essential to matter, so that one body may act upon another at a distance through a vacuum, without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is, he says, to him a great absurdity. Gravity must be caused by an agent, acting constantly according to certain laws; but whether this agent be material or immaterial he leaves to the consideration of his readers. This is the onward looking thought of one, who by his knowledge and like quality of mind, saw in the diamond an unctuous substance coagulated, when as yet it was known but as a transparent stone, and foretold the presence of a combustible substance in water a century before water was decomposed or hydrogen discovered; and I cannot help believing that the time is near at hand, when his thought regarding gravity will produce fruit—and, with that impression, I shall venture a few considerations upon what appears to me the insufficiency of the usually accepted notions of gravity, and of those forces generally, which are supposed to act at a distance, having respect to the modern and philosophic view of the conservation and indestructibility of force.

The notion of the gravitating force is, with those who admit Newton's law, but go with him no further, that matter attracts matter with a strength which is inversely as the square of the distance. Consider, then, a mass of matter (or a particle), for which present purpose the sun will serve, and consider a globe like one of the planets, as our earth, either created or taken from distant space and placed near the sun as our earth is; the attraction of gravity is then exerted, and we say that the sun attracts the earth, and, also, that the earth attracts the sun. But if the sun attracts the earth, that force of attraction must either arise *because* of the presence of the earth near the sun; or it must have *pre-existed* in the sun when the earth was not there. If we consider the first case, I think it will be exceedingly difficult to conceive that the sudden presence of an earth, 95 millions of miles from the sun, and having no previous physical connexion with it, nor any physical connexion caused by the mere circumstance of juxtaposition, should be able to raise up in the sun a power having no previous existence. As respects gravity, the earth must be considered as inert, previously, as the sun; and can have no more inducing or affecting power over the sun than the sun over it; both are assumed to be *without* power in the beginning of the case—how then can that power arise by their mere approximation or co-existence? That a body without force should raise up force in a body at a distance from it, is too hard to imagine; but it is harder still, if that can be possible, to accept the idea when we consider that it includes the *creation of force*. Force may be opposed by force, may be diverted, directed partially or exclusively, may even be converted, as far as we understand the matter, disappearing in one form to appear in another; but it cannot be created or annhihilated, or truly suspended, *i. e.* rendered existent without action or without its equivalent action. The conservation of power is now a thought deeply impressed upon the minds of philosophic men; and I think that, as a body, they admit that the creation or annihilation of force is equally impossible with the creation or annihilation of matter. But if we conceive the sun existing alone in space, exerting no force of gravitation exterior to it; and then conceive another sphere in space having like conditions, and that the two are brought towards each other; if we assume, that by their mutual presence each causes the other to act,—this is to assume not merely a creation of power but a *double creation*,

or both are supposed to rise from a previously inert to a powerful state. On their dissociation they, by the assumption, pass into the powerless state again, and this would be equivalent to the *annihilation* of force. It will be easily understood, that the case of the sun or the earth, or of any one of two or more acting bodies, is reciprocal;—and also that the variation of attraction, with any degree of approach or separation of the bodies, involves the same result of creation or annihilation of power as the creation or annihilation (which latter is only the total removal) of either of the acting bodies would do.

Such, I think, must be the character of the conclusion, if it be supposed that the attraction of the sun upon the earth arises *because* of the presence of the earth, and the attraction of the earth upon the sun because of the presence of the sun; there remains the case of the power, or the efficient source of the power, having pre-existed in the sun (or the earth) *before* the earth (or the sun) was in presence. In the latter view it appears to me that, consistently with the conservation of force, one of three sub-cases must occur: either the gravitating force of the sun, when directed upon the earth, must be removed in an equivalent degree from some other bodies, and when taken off from the earth (by the disappearance of the latter) be disposed of on some other bodies;—or else it must take up some *new* form of power when it ceases to be gravitation, and consume some other form of power when it is developed as gravitation;—or else it must be *always* existing around the sun through infinite space. The first sub-case is not imagined by the usual hypothesis of gravitation, and will hardly be supposed probable: for, if it were true, it is scarcely possible that the effects should not have been observed by astronomers, when considering the motions of the planets in different positions with respect to each other and the sun. Moreover, gravitation is not assumed to be a dual power, and in them only as yet have such removals been observed by experiment or conceived by the mind. The second sub-case, or that of a new or another form of power, is also one which has never been imagined by others, in association with the theory of gravity. I made some endeavours, experimentally, to connect gravity with electricity, having this very object in view (*Phil. Trans.* 1851, p. 1); but the results were entirely negative. The view, if held for a moment, would imply that not merely the sun, but all matter, whatever its state, would have extra powers set up in it, if removed in any degree from gravitation; that the particles of a comet at its perihelion would have changed in character, by the conversion of some portion of their molecular force into the increased amount of gravitating force which they would then exert; and that at its aphelion, this extra gravitating force would have been converted back into some other kind of molecular force, having either the former or a new character: the conversion either way being to a perfectly equivalent degree. One could not even conceive of the diffusion of a cloud of dust, or its concentration into a stone, without supposing something of the same kind to occur; and I suppose that nobody will accept the idea as possible. The third sub-case remains, namely, that the power is always existing around the sun and through infinite space, whether secondary bodies be there to be acted upon by gravitation or not: and not only around the sun, but around every particle of matter which has existence. This case of a constant necessary condition to action in space, when as respects the sun the earth is *not* in place, and of a certain gravitating action as the result of that previous condition when the earth *is* in place, I can conceive, consistently, as I think, with the conservation of force: and I think the case is that which Newton looked at in gravity; is, in philosophical respects, the same as that admitted by all in regard to light, heat, and radiant phenomena; and (in a sense even more general and extensive) is that now driven upon our attention in an especially forcible and instructive manner, by the phenomena of electricity and magnetism, because of their dependence on dual forms of power.

BOOKS RECEIVED.

The Natural History of Pliny, translated, with copious Notes and Illustrations, by the late John Bostock, M.D., F.R.S., and H. T. Riley, Esq., B.A., late Scholar of Clare Hall, Cambridge. Vol. i. London: H. G. Bohn. 1855. 8vo.

To such of our readers as have been in the habit of consulting the ponderous folio, closely-printed pages, and quaint language of Dr. Philemon Holland, hitherto the only English translator of Pliny, Mr. Bohn's convenient octavo edition will

prove an acceptable work. At present but one volume has appeared, comprising five of the thirty-seven books into which Pliny's great work is divided. Of these five, two and portions of others, are the performance of Dr. Bostock, the remainder having been translated by Mr. Riley.

Into the great merits and value of this ancient storehouse of information it is perfectly needless for us to enter. Suffice it to say, in the words of Cuvier, that it is "not merely a Natural History in our restricted sense of the term, not an account merely, more or less detailed, of animals, plants and minerals, but a work which embraces astronomy, physics, geography, agriculture, commerce, medicine and the fine arts—and all these in addition to natural history properly so called."

"It is, indeed," says Pliny, in his address to the Emperor Vespasian, "no easy task to give novelty to what is old, and authority to what is new; brightness to what is become tarnished, and light to what is obscure; to render what is slighted acceptable, and what is doubtful worthy of our confidence; to give to all a natural manner, and to each its peculiar nature. It is sufficiently honourable and glorious to have been willing even to make the attempt, although it should prove unsuccessful."

Physiological Chemistry. By Professor C. G. Lehmann. Vol. iii. Translated by George E. Day, M.D., F.R.S. London: printed for the Cavendish Society, 1854.

Experiments on the Dyeing Properties of Lichens. By W. Lander Lindsay, M.D. (From the *Edinburgh New Philosophical Journal* for October, 1854.)

The London University Calendar. 1855. London: Taylor and Francis, Red Lion Court, Fleet Street.

Voices for Progress, &c. By T. Forster Ker, Manchester.

Manual of Elementary Chemistry. By Dr. R. M. Glover.

TO CORRESPONDENTS.

Beta (Cheltenham) thinks, that if the directions of the present Pharmacopœia, in reference to Pil. Ferri Comp. are strictly followed, the alterations suggested by our Correspondent last month are not required. The specimen sent appeared to be good.

A Student (London).—*Analysis of Cod-Liver Oil.* See vol. ii., page 458. Vol. viii., pages 199, 242, and 370.

H. Ettary.—Babington's Manual of British Botany. Price 10*s.* 6*d.* Published by Van Voorst.

H. S. (Brecon).—*Chloric Ether.* The preparation sold under this name is made as previously described, by mixing chloroform with spirit of wine. On being added to water a portion of the chloroform usually separates, which is no evidence of impurity, but rather denotes that a full proportion of chloroform is present.

Pondus (Oundle).—The subject is discussed in an interesting paper by Mr. Abraham in this number.

A. B. (Spilsby), *Veritas*, and *P. A. W.*, would have been answered by post if they had given their addresses.

Mr. Bond (Ware).—Probably; but we cannot answer positively without further particulars.

H. P. E.—(1.) Considerable progress has been made with the General Index. (2.) Certainly not.

Instructions from Members and Associates, respecting the transmission of he Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, 11, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. X.—APRIL 1st, 1855.

THE APPRENTICESHIP SYSTEM.

According to their original meaning, the terms, "learning a business," and "serving an apprenticeship," were usually held to be synonymous. In consideration of the premium paid on behalf of the apprentice the master undertakes to teach him the art and mystery of his trade or business; the apprentice, on his part, contracting diligently to serve his master, his secrets keep, and all his lawful commands cheerfully obey, &c., &c. Such a contract, if interpreted literally, and faithfully performed on both sides, would seem to justify the ancient belief in the paramount importance of indentures of apprenticeship, as denoting complete education in the art and mystery of the business, and consequent fitness for the responsibilities of a master, the privileges of a freeman, with various civic honours.

It has been discovered, however, in modern times, that the terms above mentioned as synonymous, have no necessary relation to each other; that is to say, it is quite possible for a youth to become proficient in his business without serving an apprenticeship, or to go through the form of an apprenticeship without being thereby qualified to start on his own account, or worthy of the honours to which the possession of his indentures entitles him. This discovery does not detract from the merits or importance of the apprenticeship system in its original integrity, but it shows that the system is liable to abuse when the shadow is mistaken for the substance. The regulations of the Society of Apothecaries have tended to bring this fact prominently to light, by excluding from the privileges of examination and license any person who has not served an apprenticeship to an Apothecary. Whatever may have been the state of the case at the time this law was enacted, it cannot now be said, that the course prescribed is the only one calculated to afford the requisite preliminary education for an Apothecary. A young man may have acquired a practical knowledge of Pharmacy in a Pharmaceutical establishment, he may have attended the regular courses of lectures and hospital practice, and may be fully qualified to pass a first-class examination, but the door is closed against him if he cannot produce indentures of an apprenticeship to an Apothecary. From this dilemma three modes of escape have been practised. 1st. The candidate obtains indentures representing a nominal apprenticeship to an Apothecary, and antedated, if necessary, to suit the chronology of his case; or, secondly, he defies the Apothecaries Act, and commences practice as an irregular practitioner, assuming the name of a Chemist and Druggist by way of evasion; or, thirdly, he submits to his fate, relinquishes the medical profession, and becomes a Pharmaceutical Chemist—with the purest intentions, probably, in the first instance, although continually tempted to turn his medical knowledge to some account—as those are apt to do

> "Who know what's right, not only so,
> But sometimes practise what they know."

It may appear strange that young men should find themselves in the dilemma above described, but this is explained by the fact that the education of an Apothecary commences with Pharmacy, which may be acquired either in the establishment of an Apothecary or in that of a Chemist. Some prefer the latter, on account of the greater variety of prescriptions dispensed, and the advantages of the laboratory, in which case it is not uncommon for a youth to be bound to a Chemist to learn Pharmacy, and also to an Apothecary in compliance with the regulations of the "Hall." It happens sometimes that a young man having been brought up as a Chemist alters his mind, and desires to qualify himself for the medical profession, but finds himself excluded by a mere technicality, which he endeavours to evade in the best way that he can.

It is quite proper that an apprenticeship should be required as a general rule, but the error consists in the exclusion of all exceptions, and the rigid enforce-

ment of the *form* without due regard to the real *object* in view. The regulations of the Pharmaceutical Society avoid this inconvenience, by requiring either an indenture of apprenticeship or a certificate to a similar effect. It matters not whether a young man has been bound in the usual way, and has paid a premium, or whether he has been a pupil paying a stated sum annually for instruction during a sufficient period of time, or whether he has acquired his education in his father's business, under the tuition of his respected parent. In a great majority of cases an apprenticeship is the most convenient and satisfactory arrangement, and although some persons may prefer taking pupils under special contract, and others decline to receive them on any terms, apprentices abound in all directions, and "eligible openings" are always at the service of parents and guardians who have a youth and a premium to spare.

Much might be said with regard to the relative responsibilities of master and apprentice, the nature of the contract, the casualties to which it is liable, and the circumstances and terms under which it may be justifiable on either side to cancel the indentures; but reserving these matters of detail for another opportunity, we shall conclude our remarks on the present occasion by alluding to a branch of the subject, to which a correspondent has directed our attention, namely, the regulation of the supply according to the demand. Our correspondent attributes most of the evils complained of in the conduct of Pharmaceutical establishments to the competition caused by an excess in the number of apprentices inducted into the business. We subjoin the principal portions of his letter:—

"I am not in possession of any statistics enabling me to determine the amount of reinforcement the Pharmaceutical class annually needs to keep it in a state of efficiency as regards the requirements of the public, but think I may safely state there are at present quite as many 'Chemists' shops' as are wanted, in which case the number of apprentices taken should be only sufficient to supply the vacancies occasioned by deaths, and the increased demands of a continually extending population, both which I think would be amply provided for by each established Chemist inducting three or at most four apprentices, during a period of from twenty-five to thirty years; instead of which, the practice with many seems to be that of taking as large a number as can be worked off one under another, more I suspect for the sake of the premiums obtained with them, than from any consideration of the requirements of the calling; hence the market becomes surcharged with Assistants, and a young man's first experience on leaving his apprenticeship, is that of being compelled to put up with a low scale of remuneration for his services, often with the additional evils of long hours and overwork; whilst many cannot obtain employment at any rate, and are compelled to sacrifice the time and expense they have devoted to acquiring the knowledge of a business, and are glad to accept a clerkship on a railway, or in a counting-house.

* * * *

"Having passed five years as an apprentice, and perhaps an equal period as an assistant, a young man naturally begins to think of commencing business on his own account; accordingly he looks about him for an opening, when he finds to his disappointment, that, turn which way he will, Chemists' shops abound to excess, and all the central situations and commanding positions are occupied. This leads the more speculative and adventurous to open in situations which do not offer any reasonable prospect of success; however, a locality decided upon, a house taken, and the shop duly stocked and thrown open, if customers and prescriptions begin to pour in, business is conducted on average legitimate and honourable principles, a young beginner generally having as elevated feelings on these points as those of longer standing and more experience. It not improbably occurs that a young man commences with a determination to pursue a more honourable course than he has known in some cases to be followed, and at first when applied to for such articles as viper's fat, oil of white lilies, *et sui generis*, has explained to the applicants that medicinally they are both valueless and obsolete, at the same time recommending some more efficacious substitute; this not amalgamating with the purchaser's prejudices, the old-established and highly-respectable Chemist further up the street, who always keeps three apprentices, is applied to, whose practice in these cases is to take the money and serve *something;* this being often repeated, an opinion becomes whispered

about that the 'new Chemist' does not know his business, and at length, partly in self-defence, he falls into the same system of pandering to popular ignorance. A large proportion of businesses having been commenced under circumstances which offered no prospect of more than a bare existence, perhaps not even that, unless some unusual effort were made to obtain it, the united exertions of the young beginners to obtain a footing, and those of the longer established to preserve theirs intact, have called into operation the expedients of puffing, underselling, late hours, and divergence into almost all imaginary trades, until from the Chemists' shops throughout the country, an assortment of goods might be collected, comprising articles of confectionery, grocery, stationery, cutlery, jewellery, and haberdashery, from the five or ten-guinea table lamp on the one hand, to the universal penny stamp, the halfpenny skin of blacking, or the still more humble farthing box of matches on the other."

There is some weight in the arguments here adduced, which convey an idea of the natural consequence of excessive competition in any trade or business. It is not, however, a fact that the responsibility rests altogether with those who take the apprentices. The master who receives an apprentice undertakes to teach him the art and mystery of the business. He does not undertake to ensure his future success in life, nor does he imply, by signing the contract and receiving the premium, that there is an opening for a new Chemist at any given place or places in this or any other country. This is a matter to be considered by the parents or guardians, who, before binding the youth, are supposed to have made the needful inquiries, and who take on themselves the task of finding a locality for the future Chemist. It may be quite true that the number of Chemists is excessive in many places; and in proportion as this fact is made known, the evil will cure itself from the natural disinclination of persons to embark in a business reported to be overstocked.

When competition is excessive, there are two modes by which it may be met: first, by underselling, puffing, late hours, and pushing trade at the sacrifice of character; secondly, by scrupulous observance of quality, care and accuracy in manipulation, superior education and intelligence, punctuality in the despatch of business, and disregard of the unworthy practices resorted to by less scrupulous neighbours. By this latter course a character is established, which brings with it a substantial reward, while the former mode of procedure may be termed the "sliding scale" to ruin.

THE BOARD OF HEALTH AND SANITARY LEGISLATION.

The President of the Board of Health has been very active since his acceptance of office. At the time his labours commenced the cholera was prevalent in the metropolis, and prompt measures were required for the removal of all known causes of disease, with a view of preventing as much as possible the spread of the epidemic. In this emergency Sir Benjamin Hall conferred with several eminent members of the Colleges of Physicians and Surgeons and the Society of Apothecaries, whom he had appointed as a Provisional Board or Committee for that purpose. We were under an impression at the time that a permanent Medical Board similarly constituted would be appointed in connexion with the Board of Health, the propriety of which cannot be doubted, when we consider the nature and responsibility of the functions of the Board of Health, and the questions and emergencies in connexion with such functions in which medical experience is required. On reference to the Sanitary Bills now before Parliament, we observe no provision for the appointment of such Medical Board, an omission which appears to us to be rather a serious defect. The Bill to which we especially refer is that entitled "The Nuisances Removal and Diseases Prevention Act for England, 1855." This measure provides for the constitution of local authority in regard to nuisances, the payment of expenses of executing the Act, the description of nuisances to be removed, the powers of entry, and the legal form of procedure.

The 12th section defines a nuisance to include—

"Any filthy, unwholesome, or dilapidated premises; any foul or offensive pool,

ditch, gutter, watercourse, privy, urinal, cesspool, drain, or ash-pit; any animal so kept as to be injurious to health; any decaying or offensive accumulation or deposit."

The 31st section refers to other nuisances :—

"If any candle-house, melting-house, melting-place, or soap-house, or any slaughterhouse, or any building or place for boiling offal or blood, or for boiling or arushing bones, or *any manufactory, building, or place used for any trade, business, process, or manufacture causing offensive effluvia*, be at any time certified to the local cuthority by any officer of health, or medical officer, or by any two legally qualified medical practitioners, to be a nuisance, and injurious to the health of the inhabitants, the local authority shall direct complaint to be made before two Justices; and any Justice may summon before any two Justices the person by or on whose behalf the work complained of is carried on, and such Justices shall inquire into such complaint, and they may by an order in writing under their hands, order such person to discontinue or remedy the nuisance within such time as to them shall appear expedient; provided always, that if it appears to such Justices that, in carrying on any business complained of, the best means then known to be available for mitigating the nuisance or the injurious effects of such business have not been adopted, they may suspend their final determination, upon condition that the person so complained against, shall undertake to adopt within a reasonable time such means as the said Justices shall judge to be practicable and order to be carried into effect, for mitigating or preventing the injurious effects of such business."

The power of interference which this section confers upon the Justices, on the testimony of one witness (being an officer of the local Board), affords an easy and summary mode of abating nuisances of a very flagrant and deleterious nature ; but the words which we have printed in italics are so comprehensive in their meaning, that they include any business or manufactory from which an officer of health (having a delicate organ of smell) could detect any effluvia which he might consider to be offensive. In the exercise of such powers much discretion would be required, otherwise the law might be made a means of oppression and injustice, in cases where it might be a matter of opinion whether the business complained of was actually a nuisance or not, and the defendant, if poor, might be ruined ; while a more wealthy man, similarly circumstanced, might escape, either from his power of making a good defence, or on account of the immunity from attack, which usually accompanies the possession of such power. This remark applies to some chemical and other manufactories, from which the occasional evolution of effluvia may be unavoidable, and which, nevertheless, are not injurious to the health. A distinction also should be made between the case of a person establishing a questionable business in a populous district, and the gradual growth of a district round a manufactory which was the original source of attraction to workpeople and others whose dwellings formed the nucleus of a populous neighbourhood. A rigid enforcement of such powers in a manufacturing town would ruin the town, by driving away from it the source of its greatness and prosperity. Birmingham, Swansea, Sheffield, and many other places would scarcely survive the loss of their manufactories, although it must be admitted, that every practicable means should be adopted for mitigating the inconvenience arising from this important branch of industry. Justice also demands, that persons around whom a populous neighbourhood has sprung up, and who for the public benefit are called upon to remove their manufactories, should either have sufficient notice to indemnify them from any serious injury, or should receive a fair compensation for the sacrifice which they are called upon to make for the public good. A case recently occurred, in which the defendant was subjected to considerable expense (above £60) in resisting legal proceedings under the present law, for an alleged nuisance, the charge being withdrawn as untenable on the day of trial, while the defendant had no means of recovering his costs. The case has caused considerable excitement, and we may probably advert to it again. Proceedings of this description, in which justice is obviously disregarded, tend to frustrate the avowed object for which they are undertaken, by causing the Board of Health, and persons acting under its authority, to become unpopular and obnoxious to the public.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, March 7th, 1855,

MR. DEANE, PRESIDENT, IN THE CHAIR.

Donations to the Library and Museum were announced as follows:—

The Journal of the Society of Arts, from the Society of Arts.
The Journal of the Photographic Society, from the Photographic Society.
The Literary Gazette, from the Publishers.
Positive Medical Agents, from Messrs. Trübner and Co.
A Horn in which Civet had been imported; False Cardamoms, from Mr. D. Hanbury.

The following communications were read:—

NOTE ON CONCENTRATED INFUSIONS.

BY MR. SOUTHALL.

There appears to me to be one difficulty, and only one, in the way of adopting the use of concentrated infusions, which is, that some of them will not keep well without at least 25 per cent. of rectified spirit. In the case of tonic infusions, this will probably not be considered a disadvantage, and with regard to the others, medical men may use their own judgment in prescribing them when they are prepared from authorised formulæ.

I do not think that any general rule or method can be followed in making concentrated infusions. We wish to obtain a fluid containing eight times the amount of the active principles of each ingredient of the original infusion, and to accomplish this, we must consider the characters of them respectively.

Take for example the compound infusion of gentian: the extractive matter of gentian being very soluble in water, an infusion made with eight times the quantity of the root would be eight times the strength of the ordinary infusion; but the case is very different with the other two ingredients, and an infusion in water cannot be made stronger by increasing their quantities.

We have, however, at hand a menstruum which is capable of dissolving more than eight times the quantity of their aromatic principles, in rectified spirit, and by making an infusion of orange and lemon peel in a fluid composed of such proportions of strong aqueous infusion of gentian and spirit as will dissolve just eight times the quantity of their active principles, we accomplish our object with regard to them also. The due proportion of watery fluid and spirit is, I believe, about 30 per cent. of the latter, and an infusion made in this proportion is, when diluted, equally aromatic with the P. L. infusion, and perfectly transparent. The same principle must be kept in view with the other infusions, if we wish them to be really representatives of the Pharmacopœia preparations in a concentrated form.

In making these suggestions, I expect to be met by the remark that my preparation is a mere tincture; but I think if spirit must be used, we cannot employ it better than in extracting the principles of the ingredients we wish to obtain, and which cannot be obtained by any other means.

The Chairman observed, as there were two or three communications on similar subjects, it would perhaps be most convenient to have them all read before commencing the discussion upon them.

NOTE ON THE STRENGTH OF SPIRIT USED FOR MAKING TINCTURES.

BY MR. JOHN C. POOLEY.

Some remarks in the *Pharmaceutical Journal* for December, 1854, on "The Processes and Preparations of the Pharmacopœia," induce me to make a suggestion concerning the strength of the spirit used in making tinctures. The cost of spirit of wine forms, as every one will admit, an important item in the expenses of a Chemist's business, so that the temptation is great to use as weak a spirit as the nature of the article made with it will admit, without apparent deterioration. All will unite in condemning any departure from the instructions of the Pharmacopœia with regard to the strength of the spirit ordered, and yet it is notorious that many Chemists fall short in their practice in reference to this point.

Now, I have great confidence that "honesty is the best policy" in the long run, and I believe that if all tinctures both in an unmixed state and when diluted for administration, were proportionately better in appearance and other sensible qualities when made according to the prescribed instructions, the public would form an opinion favourable to the honest man, and he would reap the benefit; but is it not the case that many tinctures when made with spirit of full strength become turbid on being mixed with water, while those made with weaker spirit, under similar circumstances, remain clear, and in such instances public opinion will justify and encourage the deviation.

In suggesting a remedy for this evil, I would first say that I consider there are three (not two) classes of tinctures, in regard to the strength of the spirit. Firstly, those requiring pure spirit to dissolve and retain their active resinous and other ingredients, in which any water would be injurious; secondly, those which require a proof spirit to dissolve and retain active ingredients, some of which are soluble in spirit and some in water; thirdly, those for which water is a sufficient solvent of their active ingredients, and which *only require sufficient spirit to preserve them;* and to this latter class my suggestion chiefly applies, viz., that the College of Physicians be induced, if possible, to allow a weaker spirit to be used for their manufacture, of some stated strength below that of proof spirit, either on a safe average, or as experience may decide to be best for each tincture of the class named.

There is nothing like free trade to do away with smuggling, and on that principle I argue that the strength of spirit required to be used should be reduced to the lowest, to enable the honest trader as far as possible to compete with the less scrupulous.

When stimulants are required, they can be added to a mixture; but very frequently infusions are ordered, because the spirit of the tincture would be injurious, and the accomplishment of this suggestion would go far to remove the difficulty at present felt as to the use of concentrated infusions.

NOTE ON CONCENTRATED INFUSIONS AND APOTHECARIES' WEIGHTS.

BY MR. WILLIAM HOOPER.

What was said here at our last meeting appeared to me to indicate that an indefinite notion prevailed as to the object contemplated by the introduction of the subject of "Concentrated Infusions" for discussion at these meetings; and, as I understand the question in view, it is whether, by any means, the present dilatory, and often inconvenient method of preparing infusions can be improved or avoided altogether by substituting, under the authority of the College, some form of the medicine from which a solution may be made analogous to, or identical with, infusions of the present Pharmacopœia; and whether it would be desirable that a series of such formulæ should be introduced in any future

Pharmacopœia. It is well known that preparations of the kind indicated have been used in houses of the highest character and merit for a generation, and that 90 per cent. at least of the medicines administered in this empire are prepared with "essences" or "concentrated infusions." Much prejudice is often excited by an ill-chosen name, and "concentrated infusions" appears to me particularly unfortunate, as implying a mode of preparation involving "evaporation." Now, in my opinion, whatever may be the consequence, no formula which includes evaporation will answer the purpose or be received with satisfaction; and it is also my opinion that, with proper apparatus, all the infusions, less two or three, may be made eight times their present strength, without any evaporation whatever. It is obvious, however, that each infusion, differing in character, will require to be separately considered, and I hope that in the end it will be conceded, that to prepare a half pint of clove tea ought not to require so much time as a journey to Exeter.

I will take this opportunity of referring to some remarks that have been made respecting the employment of avoirdupois instead of troy weight in Pharmacy, and respecting the introduction of a decimal system, as proposed by a gentleman in the Journal of the present month. Referring to the avoirdupois ounce—for in Pharmacy we shall always have to do with small quantities—it has the disadvantage of consisting of a number of grains, which admits of no division without a fractional result, and if the avoirdupois pound were taken as a standard for the decimal system, it would be little better than the ounce, being dividable only by ten or five, except in the higher numbers. Now the troy ounce happens to be composed of a number of grains more dividable without a fractional result than any other, except a multiple of it, with which I am acquainted. It is dividable by twenty different numbers without a fraction of a grain remaining, namely, 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 30, 32, 40, 48, 60, 80, and 120, an advantage which every one connected with practical Pharmacy will not, upon consideration, fail to appreciate. On this account I confidently hope that the troy ounce will be retained in all Pharmaceutical operations. It has been mentioned that there is some difficulty in coming at the cost of the troy ounce in comparison with the avoirdupois. Now nothing is easier, if it be borne in mind that the troy ounce is ten per cent. more than the avoirdupois; therefore, if five ounces of anything at 8*s.* per lb. be used, in avoirdupois it would cost 2*s.* 6*d.*, adding ten per cent. (3*d.*) for the difference, in troy it would be 2*s.* 9*d.*, and so on with everything else. Another instance, and I have done. Say ℥j. musk at 60*s.*, would be 2*s.* 6*d.*, add for troy weight ten per cent., or 3*d.*=2*s.* 9*d.*, as before. When a difficulty can so readily be overcome it surely becomes unworthy of notice to every one who knows the elements of common arithmetic.

CAN CONCENTRATED INFUSIONS BE PREPARED?

BY MR. WILLIAM BASTICK.

Having on more than one occasion expressed a strong opinion in favour of concentrated infusions, I have felt it incumbent on me to support my opinion, by making a short statement of the data upon which that opinion was founded, and more especially I feel called upon to do this from finding that those who are known to be practically acquainted with the preparation of these infusions, and have a commercial interest in maintaining their reputation as efficient remedial agents, have stood aloof from the discussion which has taken place at these meetings, respecting their nature and value.

It is agreed, I believe, on all hands, that concentrated infusions when diluted, are intended to represent in their efficiency and characteristics the ordinary infusions of the Pharmacopœia, but by many Members of this Society it is denied that when so diluted, they do or can, however well prepared, represent such infusions.

The question of convenience, and some other points respecting the use of these concentrated infusions, being of secondary importance to the question, whether efficient modes have been or can be devised for their preparation?—I shall only venture to occupy your attention with the latter question.

To clearly understand the matter under discussion, it must be remembered what as a rule ordinary infusions are, namely, very weak aqueous solutions, of the more or less active principles of certain drugs, and containing in addition to these much inert matter. Bearing this explanation in mind, the principal question which Pharmaceutical chemistry has to solve is this: Can the active principles which are contained, for example in a gallon of water, when these infusions are prepared according to the instructions of the Pharmacopœia, be dissolved in a pint of the same menstruum with the aid of a little alcohol, say one part of alcohol to seven parts of water?

Now it is evident that generally this result cannot be accomplished in the manner which the title of these preparations points out, namely, by concentration, for the simple reason, that to concentrate many of the ordinary infusions, is to expel more or less of the constituents, for the exhibition of which these infusions are employed in medicine. By the term concentration, of course I mean reduction of volume by evaporation by the aid of heat, which is the sense in which this term is usually understood by Pharmaceutical Chemists.

As I have before stated to this Society, to render concentrated infusions efficient substitutes for those of the Pharmacopœia, the constituents and the characters of every drug employed in the preparation of every one of these infusions must be studied, and that in consequence of the varied properties of these drugs, no uniform method is applicable for the manufacture of such concentrated infusions. A contrary opinion, and consequently the employment of a method founded thereon, has frequently brought these preparations into a considerable amount of disrepute. In illustration, if illustration be needed, of the absurdity of any uniform method of preparation, two examples, each representing a distinct class of infusions, may be cited, namely, infusion of cloves and infusion of bark. The chief ingredient of the former, its essential oil, must be necessarily dissipated by the ordinary method of concentration, while the principal constituent of the latter, its quinine, remains stable even when it is subjected to continued boiling.

I may be asked how then would you prepare concentrated infusions of cloves and bark? As the chief object of this paper is to meet such questions, I will briefly reply that to make concentrated infusion of bark I should proceed precisely as the College of Physicians direct in their formula for making Infusum Cinchonæ Spissatum, which produces a most excellent concentrated infusion of bark; in fact, the Pharmacopœial process for making this preparation, is to all intents and purposes an admirable type of a method for preparing the concentrated infusions of those drugs which contain no volatile ingredients or constituents decomposable by moderate heat, and whose active principles are soluble to a much greater extent than they exist in the ordinary infusions.

Now in cloves we have a very different body to deal with, and consequently the process for the manufacture of a concentrated infusion of that drug must have for its primary feature the preservation of its volatile oil, or to speak more correctly, a certain portion of it. Before I proceed to describe the methods by which I propose to effect this object, it should be explained what I mean by a certain portion of the oil. The following illustration will best serve as an explanation:—For every pint of infusion of cloves the Pharmacopœia orders three drams of cloves to be employed. Now every Pharmaceutist knows that cloves contain about twenty per cent. of essential oil, and consequently, if the whole of the oil were dissolved in the pint of infusion, it would hold in solution about thirty-six grains. But no such result as this happens, because such a quantity of oil of cloves is insoluble even conjointly with the other constituents derived from the cloves in the quantity of water employed. Therefore I mean

by a certain quantity, that quantity of essential oil which is extracted from the cloves by the water in the ordinary process of making the infusion of the Pharmacopœia.

I may here remark that a knowledge of the fact that besides the chief constituents of cloves the active principles of many other drugs are very far from being completely extracted by the water in the processes of the London Pharmacopœia for preparing infusions, explains away the apparent theoretical difficulties of making many concentrated infusions.

After this explanation, I trust that the two processes by which I propose to make the concentrated infusion of cloves will be more intelligible. The first process, which is more troublesome but less effective than the second, consists in macerating eight times the ordinary quantity of cloves, previously bruised, in a mixture of one part of alcohol and three parts of water, and then filtering.

The second process, which is of more general applicability than the first, consists in distilling the same proportionate quantity of cloves with water, and collecting the essential oil. While this operation is proceeding, it will be apparent that the process for extracting the other constituents of the cloves has been going on in the retort, the contents of which, after being strained, are evaporated down sufficiently, and then mixed with the oil and the same proportion of alcohol as in the first process. When the whole has stood a day or two, it is rendered fit for use by filtration.

It will be observed that the quantity of alcohol employed in these two processes is larger than that which is said to be generally used in making concentrated infusions, but in the case of cloves this increased quantity is necessary to enable the concentrated infusion to retain in solution eight times the quantity of oil dissolved with ordinary infusion.

It must not, however, be supposed, that with other infusions containing volatile oils this somewhat large quantity of alcohol is required. On the contrary, frequently much less is sufficient; for example, chamomiles, which contain a much smaller quantity of essential oil than cloves, require only one part of alcohol to seven parts of water for the preparation of the concentrated infusion of that drug.

The second process, namely, that consisting of distillation combined with maceration, answers well for making concentrated infusion of chamomiles, which is usually considered a most difficult one to prepare, for here we have two important constituents to operate upon. On the one hand, the bitter principle, which is not volatile, and can be obtained by maceration and subsequent evaporation in a concentrated form, and on the other hand, the volatile oil to which the ordinary infusion owes its aroma, which can be separated and preserved by distillation, and be afterwards added to the evaporated liquid containing the bitter principle. By these means an unobjectionable concentrated infusion of chamomiles, I apprehend, can be made. With chamomiles and several other drugs employed for infusions, maceration without subsequent evaporation like the first process proposed for cloves, is not available, because from the bulky nature of these drugs the quantity of liquid necessary for their extraction is so large as to render unavoidable a subsequent evaporation, which would drive off their volatile oil.

I am aware that an argument may be raised against the second process which I have proposed for making concentrated infusions, to the effect that the employment of heat, which is absolutely required to separate the volatile oil by distillation, and which at the same time extracts other active principles of the drug by hot maceration, is objectionable, because the starch when present is simultaneously dissolved out, and that cold maceration is preferable for such extraction, as the starch then remains untouched. This objection, however, may be surmounted, by treating two different portions of the drug in the following manner: Macerate one portion with cold water to extract from the drug those principles which are non-volatile, and distil another portion, and collect in a

receiver the volatile oils. Of course both products must be subsequently mixed in the manner previously described, and the contents of the retorts rejected as waste.

With many drugs used for making concentrated infusions, this double process is very useful and not so expensive as it would at first sight appear to be; useful, because it avoids the solution of the starch, and not altogether costly, because the quantity of ingredients employed for making an infusion when thus treated, is frequently sufficient to make a concentrated infusion, which, when diluted, will afford an infusion twice as strong as that prepared in the ordinary way. When it is remembered that in preparing the ordinary infusions the drugs employed are generally not more than half exhausted of their active constituents, and that in preparing concentrated infusions complete extraction is effected, the economical objection to this double process will scarcely be deemed worthy of consideration. In conclusion, I wish to guard myself from the supposition that from anything I have stated on the present and on former occasions, I think that it is possible to prepare every infusion of the Pharmacopœia with advantage in a concentrated form. On the contrary, I am satisfied that more than one of these infusions can never be thus obtained, so as to represent, when diluted, the ordinary infusions of the Pharmacopœia.

Mr. Jacob Bell said, that having been unavoidably absent at the last meeting, he wished to correct a misunderstanding which had been circulated in the published report of the proceedings. He had not, as there represented, advocated the introduction and general use of concentrated infusions in lieu of those ordered in the Pharmacopœia, nor was it with any such view that he had brought forward the subject. It was a subject on which he knew that opinions differed, and the discussion of which he thought likely to be interesting to the Members of the Society, and also practically useful. He had in the first instance stated the case quite impartially, suggesting certain questions for the consideration of the Members. The first of these questions, namely, "Whether it was justifiable to substitute concentrated infusions when infusions were ordered in prescriptions?" had been settled in the negative. He fully concurred in this decision, which he believed had been unanimously confirmed at more than one meeting. The other questions relating to the value of that class of preparations, the processes, and the propriety of introducing them into a future Pharmacopœia, had not been finally settled, but many practically useful suggestions had been thrown out, and would at the proper time receive due consideration on the part of the Pharmacopœia Committee. The result of the discussion had, so far as it had gone, fully realised his expectations, having settled a previously disputed question, and elicited practical suggestions and information on a subject which had excited general interest.

Mr. Hooper thought infusion of buchu was one of those which it would be difficult to prepare in a concentrated state without injuring its efficacy. It was generally considered that the efficacy of infusion of buchu depended in great measure upon the large quantity of mucilaginous matter which it contains; and a concentrated infusion in which most of this would be separated, would necessarily be less active than that made according to the Pharmacopœia.

Mr. Giles agreed with Mr. Hooper. He thought they were not yet in a position to recommend the exclusion of the so-called inert matter from infusions. That was a question which must be decided by the observation and experience of the faculty, who were known to be strongly in favour of the fresh infusions, in which these elements of less apparent activity were present; and it would be precipitate in them to condemn them as useless adjuncts in the absence of actual testimony to their inutility, while the fact was, that at present all the testimony was in the other direction. He was himself inclined to concur in that view, and to believe that the less active constituents which existed in association with the active principles of vegetables exerted important

influences in causing the active principles themselves to be digested. They communicated a bland character to the infusions, which mere solutions of the isolated alkaloids did not possess. He quite agreed that it was probable that the active principles were often imperfectly exhausted in the preparation of infusions, and he had never disputed the desirability of revising the formulæ for making them, which, he thought, might be attended with advantage. It had, for example, occurred to him that the intentions of the process would be more completely executed if more care was taken to subject the ingredients to a full boiling temperature; say by adding them to the water still boiling, and maintaining the ebullition for a few seconds over the fire, instead of pouring the water on to the cold ingredients. By this means a more perfect coagulation of the albumen would be effected, and the resulting infusions would probably keep better. He believed that attention devoted to this object, to the proper periods for maceration, and convenient vessels for conducting it, would be rewarded with better consequences than the pains bestowed upon concentrating infusions.

Mr. Hooper thought in the case of infusion of calumba that the large quantity of starch present, when it was made as directed by the London College, rendered it more liable to spoil than it otherwise would be.

Mr. Whipple said, the so-called inert starchy matter of calumba was a nitrogenous body. He placed a specimen of this body on the table for examination by those present.

Mr. Redwood referred to some experiments made a few years ago by Mr. Greenish, and communicated to a meeting of the Society, from which it appeared that infusion of calumba, made with cold water, underwent decomposition sooner than when prepared with hot water, provided that in the latter case the water was absolutely boiling when in contact with the vegetable matter. The boiling water coagulated, and thus caused the separation of, albumen, while cold water held it in solution, and it was this which rendered the infusion so prone to undergo decomposition. The starch of the calumba, in the absence of albuminous matter, was not particularly subject to change.

Mr. Bastick said he was quite aware of the importance of separating albuminous matter with the view of promoting the preservation of infusions, and infusion of calumba, if made with cold water, should be afterwards boiled, to separate the albumen.

The Chairman wished to direct attention to what he thought was a frequent source of variance in the preparation of infusions, and that was the differences of temperature of the macerating ingredients, depending upon the quantities employed, and upon the nature of the infusion pot. It was quite obvious, that in making a gallon of an infusion with boiling water, the ingredients would retain the heat longer than if only a pint were made. Then, in making a small quantity of an infusion, not only did the cooling take place more quickly from radiation, but if the ingredients were put into a cold infusion pot, and especially if a thick one, the water was immediately cooled to some extent through conduction. It would, he thought, be a better mode of operating than that usually adopted, to put the ingredients into the water while boiling in the vessel in which the maceration is to take place. He agreed with what had been said with reference to inert matter in infusions.

THE DECIMAL SYSTEM OF WEIGHTS AND MEASURES.

The Chairman said, as the subject of weights and measures had been alluded to by Mr. Hooper, he might mention that the College of Physicians did not intend to alter the weights and measures of the Pharmacopœia at present, as the decimal system was under the consideration of Government, and they would wait that decision.

Mr. Jacob Bell said, he was not so enthusiastic as some persons appeared to

be in favour of an alteration of the weights and measures to the decimal system. He was quite sensible of the existing evil, arising chiefly from the confusion between the troy and the avoirdupois weights, but thought it desirable to provide the nearest approach to a remedy, with as little change as possible—in other words, he would prefer a reform to a revolution in the system of weights. He thought the best arrangement, under existing circumstances, would be a modification of the troy and the avoirdupois weights in this manner, making the weights and the measures correspond:—

20 grains = 1 scruple
3 scruples = 1 drachm = 1 fluid drachm
8 drachms = 1 ounce = 1 fluid ounce
16 ounces = 1 pound = 1 pint
8 pounds = 1 gallon

If the value of the grain (on this hypothesis) were to remain as at present, this would of course increase the ounce and the weights above it. If the fluid ounce were taken as the starting-point, then the value of the grain would be reduced by a small fraction. For pharmaceutical purposes, this scale of weights and measures would be convenient, on account of the facility of calculation, the several quantities admitting of subdivision without a fraction down to two-and-a-half grains, while the introduction of the 20 oz. pint into the system, gives a fraction at two-and-a-half ounces. It would, moreover, be so near an approximation to the troy weight with the familiar 16 oz. pint, and 8 pint gallon, that the inconvenience of the change would be very small compared to that of discarding all weights and measures except the grain, and introducing a new set on the decimal principle. The subject, however, required much consideration, and arguments might be adduced on both sides. The plan which he had suggested, he had long thought to be the best, on the principle that any change in the weights and measures is, and must for a considerable time be, an evil, and when several evils are under consideration, it is policy to choose the least.

Mr. Griffin requested permission to make a few remarks on the proposal to give a decimal arrangement to the existing system of Imperial Weights and Measures. He considered that the change might be effected without great difficulty, because a decimal relation already existed between the avoirdupois pound, our standard for weights, and the gallon, our standard for measures. Ten avoirdupois pounds of water, at 60° Fahr., make an imperial gallon. One pound of water is sixteen fluid ounces, or four-fifths of a pint. Its volume is a decigallon, or the tenth part of a gallon. If the avoirdupois pound were divided into 1000 units of weight, and the decigallon into 1000 units of measure, we should have a decimal system as perfect as that of France—a system in which there would be a strict correspondence between the weights and measures, and yet without interference with the existing legal standards. The unit of weight in the proposed system would be equal to 7 imperial grains. The corresponding unit of measure would be of the bulk of 7 grains of water. It would be necessary to give different names to these units, in order to distinguish the weight from the measure. The weight might be called a *Baro*, and the measure a *Barim*. 1000 baros would be equal to a pound, and 1000 barims would be equal to a decigallon. Weights intermediate between the pound and the baro would be obtained by taking the *Ounce* at the tenth part of the pound, and the *Drachm* at the tenth part of the ounce. The measures could be subdivided correspondingly. The formula 1℔ .525 would then represent 1 pound 5 ounces 2 drachms and 5 baros. The French decimal system is exactly similar to this, for 1k. .525 is read as 1 kilogramme 5 hectrogrammes 2 decagrammes and 5 grammes. It has, however, been found in France that the denominations existing between the kilogramme and the gramme are too cumbrous for popular use; so that the formula 1k. .525 is commonly read as 1 kilogramme and 525 grammes, omitting the intermediate denominations. The same result would, no doubt, to some extent occur with us, and the formula 1℔ .525 would be read as

1 pound and 525 baros. The weights and denominations of ounce and drachm would nevertheless be highly useful; for the formula .525 would be $5\frac{1}{4}$ ounces, and .025 would be $2\frac{1}{2}$ drachms.

The proposed decimal ounce would contain 700 of our present grains, and would bear to the avoirdupois ounce the relation of 70 to $43\frac{3}{4}$ or 16 to 10, and to the troy ounce the relation of 70 to 48, or nearly of 3 to 2. Being divisible into 10 drachms and into 100 barims, and also, if required, into halves and quarters, it offers as many subdivisors as are likely to be required for any purpose of science or commerce.

The term *grain* could disappear, unless it were thought fit to retain it for the unit instead of adopting the word *baro*. The term *pint* would also disappear, unless retained to denote the decigallon, instead of denoting, as it now does, the octagallon. Such terms as *fluid* ounce and *fluid* drachm are too clumsy to be worth retaining. It is expedient to have terms that will at once distinguish between a measure and a weight.

The barim—7 grains of water—is a very convenient unit-volume for liquid measures. The French centimetre cube=1 gramme of water, contains 2.2 barims; but in practice this unit has been found to be inconveniently large, and in consequence nearly all scientific instruments are graduated to *half centimetre cubes*, a division that bears to the barim the relation 1.1 to 1.0.

The proposed decimal weights and measures possess some convenient relations to the common method of indicating the specific gravities of liquids. The specific gravity of water is taken universally at 1.000. In this case the figure 1 before the point would represent 1 decimal avoirdupois pound, and the figures after the point would represent successively the ounces, drachms, and baros, indicated by the specific gravity. That is to say, a decigallon of water weighs 1lb avoirdupois. Consequently a decigallon of oil of vitriol, spec. grav. 1.85, weighs 1 pound 8 ounces 5 drachms. A decigallon of alcohol, 60° over proof, spec. grav. .84, weighs 8 ounces four drachms. Of course, 1 gallon of water weighs 10lb; 1 gallon of oil of vitriol weighs $18\frac{1}{2}$lb; and 1 gallon of alcohol weighs 8lb 4 ounces.

As it is sometimes more convenient to measure liquids than to weigh them, I may point out another mathematical relation between these decimal measures and the specific gravities of liquids. If we know the specific gravity of a liquid, and desire to find the measure of 1lb of it, we need only look for it in a suitable table of reciprocals. The reciprocal of the specific gravity of a liquid is the volume of 1lb of it, expressed in barims. Thus the reciprocal of sp. gr. 1.000 (= water) is 1000; that of sp. gr. 1.85 (= oil of vitriol) is 540.5; and that of sp. gr. .84 (= alcohol) is 1190; and 1000, 540.5, and 1190 barims, contain respectively one pound avoirdupois of these liquids.

The decimal system affords great facilities for the performance of chemical analyses by the method of centigrade testing, as I had the honour to point out to the Pharmaceutical Society on a former occasion.

DECIMAL WEIGHTS AND MEASURES.

Weights.	Measures.	Proposed Unit, the Baro.	Value in Imperial Grains.
Ton	Tun ?	1,000,000	7,000,000
Cwt.	Pipe ?	100,000	700,000
Stone	Gallon	10,000	70,000
Pound	Decigallon, or decim	1,000	7,000
Ounce	Centigallon, or centim	100	700
Drachm	Milligallon, or millim	10	70
Baro	Barim	1	7

DECIMAL WEIGHTS.

Stone.	Pound.	Ounce.	Drachm.	Baro.	Value in Grains.
1.	10.	100.	1000.	10,000.	70,000.
.1	1.	10.	100.	1,000.	7,000.
.01	.1	1.	10.	100.	700.
.001	.01	.1	1.	10.	70.
.0001	.001	.01	.1	1.	7.

DECIMAL MEASURES.

Gallon.	Decim.	Centim.	Millim.	Barim.	Value in Grains.
1.	10.	100.	1000.	10,000.	70,000.
.1	1.	10.	100.	1,000.	7,000.
.01	.1	1.	10.	100.	700.
.001	.01	.1	1.	10.	70.
.0001	.001	.01	.1	1.	7.

1 Quart =2500 Barims
1 Pint =1250 Barims
1 Fluid ounce= 62.5 Barims

1 Cubic inch =36.06543 Barims
1 Centimetre cube= 2.2 Barims
1 Litre = 2.2 Decigallons

ENAMELOID PHOTOGRAPHS.

At the conclusion of the meeting, Mr. J. Stone, of Brighton, exhibited some specimens of an improvement in the mounting of photographs, which he has recently introduced under the above title. The process consists in giving to the common paper photographs a smooth and, to all appearances, an enamelled surface, by the use of a cement which, whilst it permanently attaches the photograph to the glass which is placed over it, throws up the minutest details of the picture with great distinctness. We understood Mr. Stone to say that the cement consisted of a mixture of which gelatine was a principal ingredient.

Mr. Curtis has sent the following correction of an error in the report of the last meeting. It is there stated that Mr. Curtis considered concentrated infusion of gentian one of the best of this class of preparations. This is an error, and should have been—"The infusion of gentian of the Pharmacopœia was one of the best of this class of preparations," not alluding to the concentrated.

PHYTOLOGICAL CLUB.

Meeting, March 14th, 1855.

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Several new Members were elected, and a list of candidates proposed.

A donation of British plants for distribution was announced from Mr. Daniel Hanbury.

Mr. Grundy then read the following paper :—

ON THE STRUCTURE OF THE STARCH GRANULE.

The structure of the starch granule being by no means clearly understood, I am induced to submit the results of a few observations on the subject, with the view, if possible, of adding a little to our knowledge of its structure. There are, as is well known, two views of its constitution; one, especially advocated by Schleiden, considers it as increasing by means of layers deposited from within outwards, and

that there is no membrane enveloping the granule; secondly, the view of Nägeli and others, that it is a true cell, consisting of a wall and contents, the starch being deposited from without inwards. These two views have been considered completely at variance with each other. I trust, however, to be able to show that while neither is absolutely false, neither fully accounts for all the phenomena observed in the development of starch. With regard to the first view, the balance of evidence certainly appears in favour of the exogenous, so to speak, development of starch; that is, that the starch is deposited in layers, the inner layers being formed first. As our esteemed President observed at a former Pharmaceutical Meeting, "If you examine the young tuber of the potato, you find only a few fully formed starch grains, and numbers of small, round, incomplete grains; while in the mature tuber the reverse is the case—the majority of the starch grains are fully formed, and only a few of the small, incomplete grains are met with. If, however, the fully formed starch be carefully examined, the inner concentric layers are found to be circular, and to present, in fact, precisely the figure and appearance of the small, undeveloped grains, leading thus to the inference that the remainder of the starch has been deposited round these small granules." Now there is no doubt that, as far as it goes, this is a true statement of fact. It appears to me, however, that it does not fully explain all the phenomena. Now the starch is usually free, in the sap, and in those instances in which it is met with adhering to the cell wall, I think it is only entangled in the mucilaginous protoplasm. Yet we cannot discover any proof, by the use of tests, or other means, of the existence of starch, as such, in the cell sap. Von Mohl supports this conclusion. To me it appears that starch is not at all soluble in water, nor in any state of combination as starch. But instead we find gum and other matters in the cell sap, of which starch may be formed, but not starch itself. I think gum, starch, and sugar, members of one series, each higher in its state of organization than the other, the crude compounds absorbed by the fibrils of the root being transformed first into gum. If we adopt Schleiden's view, I do not see how we are to account for the deposit of starch. If it be a mere chemical product, it seems singular that it should only be deposited in such definite forms, and never on the cell walls, or on the chlorophyll granules which sometimes occur in the same cell with the starch.

There is, however, the view of its composition advocated by Crüger. He asserts, that the primordial utricle is the source of the starch; that the starch granule first appears as a mere point, not coloured blue by iodine; and that, in all stages of the starch granule, a layer of a nitrogenous substance, coloured yellowish by iodine, covers the granule. This layer he looks upon as altered protoplasm, in the course of transition to starch. He obtained plants in which the starch grains were few in number, and in which they were embedded in the protoplasm lining the cell. I do not see, however, how this view is to be applied in all cases; in the potato, the cells are quite filled with starch—all cannot be imbedded in the protoplasm; besides, protoplasm is nitrogenous, starch is not; protoplasm, therefore, cannot form starch in equal quantity with itself, and there certainly appears more starch in the full-grown potato cell than there ever was of protoplasm. Starch is too, I think, denser than protoplasm, which would tend to increase this difference. My own view on the subject is, that the starch granule is truly a cell, having a wall distinct from the contents. I am inclined to believe that the first formation of starch is by a small portion of the protoplasm becoming aggregated, as a nucleus, developing over itself a membrane; this membrane then commencing to secrete starch around the original nucleus; in fact, that they are produced much as the spores of some algæ are produced, in which the protoplasm splits into many portions, each secreting itself a cellulose wall. With this addition, I take Schleiden's view of the structure of starch as entirely correct, the only point required being, explained by the hypothesis of a membrane, the exact origin of the starch. Indeed, I consider the starch cell as closely analogous to the secreting epithelium cell of animal physiologists—viz., a cell which draws the materials of its growth from the surrounding fluid, and having reached the limit of its growth, dies as a cell, and becomes amenable to chemical influences. The point on which I lay most stress, as proof of its cellular character, is the definite size and shape of the granule. If it be formed, as Schleiden asserts, by mere layers of deposit, I see no *à priori* reason why this process should cease at any particular time, or why the size and shape of the exogenous starch granule should not be as indefinite and unlimited as those of an exogenous tree. A cell, however, has, under the same

circumstances, a tolerably definite size and shape. The fully formed cells of any organ in the same plant agree in the closest manner among themselves as to size and shape, however much they may differ in these respects from the cells of other organs, or from those of the same organ in other plants. This is seen in the clearest manner in undoubted free cells, as spores and pollen grains which in the same plant agree in the closest manner with each other. The cellular character of starch is obscured by the fact, that the contents are at all stages solid, so that the use of the compressorium and other means usually employed to determine the cellular character of an object fail from this cause.

Now if starch be merely a chemical product of the protoplasm, whence does it obtain the distinct definite form so characteristic of this substance? The starch granules of each plant have a certain distinctive form and appearance peculiar to themselves, by which they may be recognized under the microscope, and there are few, if any plants, the starch granules of which are precisely similar in form. Crystallization is the only means by which homogenous substances, whether organic or inorganic, are aggregated into definite forms. No one, however, would call the starch granule a crystal. Starch, also, does not always occur solitary in cells; it occurs in company with chlorophyll, and possibly raphides. If it were formed by exogenous deposition, it seems to me very probable, that occasionally one of these foreign bodies might be entangled and enclosed in the substance of the granule, not often, perhaps only once in a thousand times, yet, as far as I am aware, no such occurrence has ever been observed.

With regard to the observed existence of a membrane, of which I have not yet spoken, the experiment of Mr. Busk, and also that of merely boiling a little starch in water, and examining the results, are, to my mind, quite conclusive. In the latter case we observe numerous thin, collapsed, vesicular-looking membranes, which do not appear to dissolve after many hours' boiling, while the true starch which these membranes enclose is extracted by the water, as is proved by its behaviour with iodine. This membrane appears to me to differ, not only in consistence, but also in chemical character, from starch, since, if iodine be added to starch which has been boiled in water, and the result examined by the microscope, the blue colour is seen to be due to amorphous masses of starch, the membranes, when seen separate from the starch, not appearing coloured.

The appearance of colouration was produced in some cases by portions of yet adhering starch, which of course was coloured blue. This might, however, be distinguished from a true colouration of the membrane by its patchy granular appearance, and also by the colour not being thicker where wrinkles were visible in the membrane. A large quantity of iodine was required to produce any particular effect ; the membranes then became of a deep brownish-red, but not blue, which certainly appears to evidence a different composition from starch. At first I was inclined to believe the enveloping membrane to differ from cellulose, not being able to produce a blue colour with iodine and SO_3. I have since succeeded in producing this effect by macerating boiled starch in dilute NO_5 for several hours. Schleiden has observed that the outer layer of the starch granule behaves differently with iodine from the rest, and explains it by saying that the outer layer becomes infiltrated with foreign matters, which hinder the characteristic reaction of starch. This is in all probability correct, but it is inconsistent with his own theory. The outer membrane of the small round granules is affected precisely as that of the larger, yet, according to his views, the small granules were the nuclei, so to speak, on which the larger were to be deposited. Each layer in succession ought to be infiltrated, but evidently is not. His explanation, in fact, is an argument in favour of my view. The membrane being always exterior, of course runs much greater chance of infiltration. I have not yet said anything of the concentric lines, my theory not being inconsistent with either of the views entertained on the subject. Although I believe in the existence of a membrane, I do not see that the lines must necessarily arise from foldings of that membrane. They may still be due to the existence of layers. Schleiden states that the concentric lines may be traced all round the granule. I have not been able to satisfy myself of this, and am inclined to believe that only the interior lines can be traced entirely round. If starch be heated on a metal plate until it turns brown, then treated with weak solution of iodine and examined, crescentically-shaped pieces appear to separate from the large end of the granule, leaving a central rounded portion, while the smaller end

is not so visibly affected. Of course, according to Schleiden's view, the continuity of the lines is a necessary consequence of the formation by layers. I did not attempt to trace the continuity of each line : I endeavoured to count the number from the small end to the hilum, and from thence to the large end, and could always distinguish more lines in the latter direction. The starch certainly appears, when heated on a metal plate, to separate in the direction of the concentric lines. Also, if starch be made into a paste with gum, and thin slices be taken from the mass, many sections of the granules will be made. As far as my observations extend, if a granule from which only a small piece has been cut off be observed, cross lines, upon the cut surface, uniting the concentric lines, will be seen. If, however, the section extend through the middle of a granule, such lines will not be observed. Also in examining uninjured starch, I fancy that, the starch being beyond the focus as it is brought into focus, the concentric lines come into view on the surface of the granule before the edges are quite brought into focus, as though the markings were superficial. May not the lines be formed by foldings of the membrane dipping into the starch, and disposing it to break up in the direction of the folds, somewhat analogous, in fact, to the ruminated albumen of the nutmeg ? I do not positively assert this view, but merely throw it out as a conjecture ; it seems to me not improbable. The hilum I believe to be the remains of the nucleus, which in full-grown vegetable cells is generally absorbed ; that it is a hollow space filled possibly with amorphous starch, perhaps only with water or cell sap. I think, however, that the only method of attaining a sure knowledge of the structure of the starch grain is by observations on its development ; by taking, for instance, a potato, examining by sections the first appearance of the tubers when they appear as mere swellings of a fibril, and continuing the observation up to the cells of the fully formed tuber. I purpose making some observations on the subject during the spring, and if I find them of any value, will communicate them to the Society.

After an interesting discussion, Mr. Grundy promised to make some further obse ations for the next meeting, which will take place on Wednesday, May 9th.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

At a Scientific Meeting, held in the rooms, 72, Princes Street, Edinburgh, on Thursday evening, 8th March, at a quarter to nine o'clock,

MR. H. C. BAILDON IN THE CHAIR,

Dr. Inglis, President of the Royal College of Surgeons, Dr. Macadam, Messrs. Bremner, Blanshard, Shaw, Young, Tait, &c., were present, when a paper was read upon

WATER, WITH AN ESPECIAL REFERENCE TO ITS ACTION ON METALLIC LEAD.

BY MR. JOHN MACKAY.

He introduced the subject by noticing water itself ; touched upon some of its peculiar features ; recounted the various forms in which it is presented to us in nature ; and proceeded to dwell at some length upon the action of different kinds of water upon lead.

He placed before the meeting, as an evidence of the action produced by the oxygen in distilled water upon lead, forming the oxide of the metal, and in its turn combining with the carbonic acid of the atmosphere, a sample of pure water which had been allowed to remain upon slips of lead since April, 1854. He also showed rain water which had been placed upon metallic lead at the same time ; and in order to prove both the rapidity of the action and the various stages of the process of these lead-consuming waters, he submitted specimens of melted snow from the top of Arthur's Seat—distilled water—well water—and ordinary spring water, as supplied to Edinburgh—all of which had been placed in contact with lead, from the 3rd of

March onwards to the evening of meeting. He then referred to several striking instances of severe cases of illness, and even poisoning, which had resulted from the incautious use of water which had come in contact with this metal, such water, upon analysis, having been found to be exceedingly pure previous to being brought into contact with the metal. After referring to the action which goes on, and showing the necessity which exists for the presence of air to enable the metal to be decomposed, he proceeded to give an interesting account of the present attempt to supply the inhabitants of Glasgow with Loch Katrine or Loch Lubnaig water. He stated that the liquid elements in both these lakes were known, from actual experiment, to be very pure, more especially that in the former, which is nearly as free from saline impregnation or any other impurity as distilled water. He explained fully the nature of the various oppositions which had been made to the introduction of water from the localities referred to so far back as 1846, in which year the Lubnaig scheme was first promulgated, and which was laid aside at that time chiefly in consequence of the Lords of the Admiralty fearing a serious diminution in the supply of water to the tributaries of the river Forth, which is fed by streams proceeding from Loch Lubnaig and Loch Venachar, and which would thus have interfered with the navigation for a considerable distance above Alloa. The inhabitants of Stirling further objected, on the grounds that their supplies would be partly cut off; while the mill-owners required large compensation, and which, as the lake was easily flooded, it would not have been possible to give. This scheme was, however, again revived in 1852, and then its twin sister, Loch Katrine, was for the first time brought into competition with Lubnaig. To enable the meeting to judge of the comparative purity of the one water as compared with the other, he showed samples of Loch Katrine water and Loch Lubnaig water, both of which had been nearly a year in contact with lead, but which had been closed and sealed up after a few days' exposure to the air. In the former case a considerable deposit of white silky crystals was observable, and the liquid itself appeared quite opaque and loaded with a heavy white powder. The latter was to all appearance comparatively pure, the deposit being very trifling. As Loch Lomond water had also been proposed as a source from whence to supply Glasgow, he submitted samples of water from this well-known lake, which had been in like manner in contact with lead for some months, and the striking peculiarity observed here was, that in the water taken from the top of the loch the water was so pure as to affect lead nearly as much as distilled water, while water taken about 30 miles lower down, or near the outlet at Balloch, scarcely affected the metal at all.

He proceeded shortly to state the manner in which some of the promoters proposed to introduce such salts into the pure Loch Katrine water as would prevent any serious action upon the pipes or cisterns. Some differences of opinion had occurred among the Chemists consulted upon this subject, and there were, as was frequently the case, a formidable array of authorities on both sides. These differences, however, had been to a great extent reconciled, and the eminent engineers, Messrs. Stephenson and I. K. Brunel had, within the last few days, given in a report, by which they condemn Loch Lomond, from the great expense necessary to convey and raise the water to the town, while they consider the Loch Katrine scheme unobjectionable. The quantity of water required daily for Glasgow is stated at twenty millions of gallons, and it appears a supply equal to forty millions daily can be abstracted from Loch Katrine, without interfering in the least with the necessary supplies for other purposes. All opposition from the existing Companies has been overcome, and there is every prospect of this romantic Lake becoming in future a reservoir for Glasgow.

Mr. Mackay concluded his remarks by drawing some deductions from what he had read, regarding the extreme attention and care with which, in all Chemical and Pharmaceutical operations, the purity of water should be ascertained, and with the evidence set before the meeting thought it almost unnecessary to remind them, that a leaden head to a still, or even a piece of leaden pipe in the worm, were very likely to contaminate water during distillation, and therefore such an arrangement ought to be cautiously guarded against.

Dr. Macadam made a few remarks upon the subject of the rapid effect produced upon scraped lead when brought into contact with water, especially if the liquid be pure; after which

Mr. Shaw proceeded to read a paper on "The Anacharis Alsinastrum," a new water

weed, recently introduced into Britain, and which he illustrated by fresh specimens and drawings of the plant.

Twenty-four specimens of Medicinal British Plants, prepared and presented to the Museum by Mr. J. B. Kent, Stanton, Suffolk, were shown to the meeting, and were exceedingly admired.

Thanks were voted by acclamation to Mr. Kent for his handsome donation.

Coffey's Patent Syphons were shown in operation.

LIVERPOOL CHEMISTS' ASSOCIATION.

The usual Fortnightly Meeting of this Association was held at the Royal Institution, Colquitt Street, on Friday evening, February 16th,

MR. ABRAHAM, VICE-PRESIDENT, IN THE CHAIR.

The Secretary informed the Meeting that Dr. Nevins, Lecturer on Materia Medica, and Mr. T. C. Archer, Lecturer on Botany, had kindly offered to admit Members of the Association to their respective Lectures at the Royal Infirmary Medical School during the ensuing Session on payment of half the usual fee, and expressed a hope that as many Members and Associates as could attend would avail themselves of the advantages so liberally offered. He also reminded those Apprentices intending to compete for Mr. Rawle's prize for the best essay on "Hydrocyanic Acid," that the essays must be sent in on or before March 1st.

Mr. W. Lawson then read the following paper on

THE MANUFACTURE OF LIQUOR AMMONIÆ.

The economical preparation of liquor ammoniæ has engaged the attention of manufacturing Chemists for a considerable time, and seems to have attained its present state in consequence of the rapid spread of gas-lighting, considerable quantities of ammonia being obtained, as one of the bye-products in its manufacture; hence in almost every town and village where gas is consumed, we find factories for the preparation of liquor ammoniæ. The principle on which ammonia is generated on the large scale, does not differ materially from the process employed in laboratory experiments; viz., by introducing into a retort a mixture of an ammoniacal salt with hydrate of lime, and applying a gentle heat; in large factories, however, the salt is prepared in the same premises with the solution. The following process will be found to answer as well as any with which I am acquainted:—

PROCESS.

Common gas liquor is introduced into a series of large stills, and gradually heated up to the boiling-point, when the ammonia is given off in combination with steam, sulphuretted hydrogen, &c.; this impure mixture is conducted through a leaden worm surrounded by water, into a large leaden cistern or box, until a sufficient quantity has been collected for saturation with So_3, which combining with the NH_4O, forms sulphate of ammonia, and liberates large quantities of sulphuretted hydrogen; the mixture is next pumped into leaden vats placed over the stills, and through which the worm containing the impure solution of ammonia previously alluded to is conducted before it is brought into contact with cold water, and thus the hot vapour is made to concentrate the liquor already produced. After attaining a considerable degree of density, the liquid is drawn off into large leaden boilers set in fire bricks, and completely surrounded by a flue, where it is boiled down to such a density that on cooling it is found to become nearly a mass of salts. Four stills, capable of containing 200 gallons each, may be readily worked off twice in twenty-four hours, and will yield about eight to ten cwt. of ordinary sulphate of ammonia, depending upon the strength of the gas liquor employed.

This rough sulphate of ammonia is next introduced into a still containing a quantity of milk of lime, and heat gently applied; a rapid evolution of gas soon takes place, which is conducted through upright iron pipes placed in a cool situation over the still, when the whole of the steam in combination with the gas becomes condensed, and falls back into the still, while the pure gas is conducted through leaden or gutta percha tubes into a set of glass carboys, arranged and connected

like a series of Woulfe's bottles, about three parts filled with distilled water, into which a piece of glass tube connected with the delivery pipe just dips. Water possesses the power of absorbing this gas in a most extraordinary degree; at a temperature of 50°, it is capable of condensing from 600 to 700 times its bulk; by this absorption, the bulk of the solution becomes gradually increased, until, in the end, six parts of water becomes increased to ten, and the specific gravity of the liquid is reduced from 1.00 to 0.875. In applying heat to the still, it is necessary to be exceedingly careful in the first place not to apply it too strongly, otherwise the gas will be evolved so rapidly as to endanger the safety of the receivers by the liquid becoming too hot; and in the second, towards the latter end of the process especially, to maintain a gradually increased heat, otherwise a vacuum will be formed, and you will thus lose a large quantity of your product. A still containing about one cwt. of sulphate of ammonia will require about twenty-four hours to work off, and will produce from sixty to seventy pounds of the strongest liquor ammoniæ, having a sp. gr. of 0.875, and containing 32.5 per cent. of dry ammonia.

The discussion on "Concentrated Infusion," which was adjourned at the meeting held 22nd December, was then resumed by

Mr. MERCER said, though the subject had been much discussed, there were still two points on which further information was required. First, was the introduction of such preparations into the Pharmacopœias desirable? and second, what were the best methods of preparing them? The strongest argument which can be advanced in support of the first question is the extent to which they are already used; for though it had been urged that they were principally used by Apothecaries in dispensing their own medicines, he believed they were quite as much used by Druggists. Such a statement might be questioned, but he had no hesitation in saying, that not only were they at the present time extensively used in dispensing prescriptions, but they would continue to be used, whether introduced into the Pharmacopœia or not. Such being the case, whether was it better that Druggists throughout the country should be using preparations, differing not only in the mode of manufacture, but also in strength, taste, and appearance, as might be seen by examining the specimens on the table, no two of which, professing to be the same article, but obtained from different makers, were alike; or whether formulæ should be authorized, which would ensure to a much greater extent than at present uniformity in the results? He did not defend the use of concentrated infusions, but being in extensive use, he thought their introduction into the Pharmacopœia desirable, but whether or no it was advisable depended very much upon the answer Pharmaceutists gave to the second question—how were they best prepared? With our present amount of knowledge on the subject, though he thought it desirable we should have authorized formulæ, still he did not think it advisable, for the best he had yet seen were anything but perfection. The objection he raised at the last meeting, that in consequence of spirit being used, acetous fermentation was always likely to take place, had not yet been met. All concentrated infusions contained spirit, and so far in discussing the subject it had been taken for granted that its presence was absolutely necessary. It appeared to him that the best, and in the end most successful and satisfactory way of investigating the subject, would be to take each infusion separately, and ascertain not only to which of its constituents it was indebted for its medicinal activity, but also the properties which had recommended it to the notice of the Physician. Then endeavour to determine the best method of separating those constituents which are active, from those which are inert, and which also may tend to prevent the preservation of the product, or destroy the energy of its properties. Examined in this way there are doubtless many infusions which could be obtained in a highly concentrated form, and yield, when diluted, preparations equal in every respect to fresh ones; while there are others prescribed, not so much for their medicinal activity, as for their aroma and grateful flavour, which could not be concentrated without material deterioration. Indeed, the question of concentration must be examined into much more closely than it has been, in the laboratory, before we can expect it to be much elucidated in the lecture-room; and, as it is one of those questions which comes peculiarly within the province of the Pharmaceutist to investigate, the College of Physicians will be to a great extent guided in finally deciding whether or no concentrated infusions shall

be recognized in a future edition of the Pharmacopœia, by the information they derive from the Pharmacopœia Committee of the Pharmaceutical Society.

Dr. Edwards said many persons in making concentrated infusions used proof spirit as a menstruum instead of water, and as a matter of course the result was very different to what it would be were water used alone. He thought the advantages to be gained by authorizing concentrated infusions had been considerably overrated, and that even in a pecuniary point of view, dispensers would find it more advantageous to use freshly-made infusions than concentrated ones.

Mr. H. S. Evans remarked that the plan he adopted in making them was by percolation with cold water, evaporation in a water-bath, and adding, when cold, the necessary quantity of spirit.

Mr. Lawson prepared concentrated infusions by evaporating the infusions made with boiling water, and adding a small quantity of spirit.

The Chairman expressed his surprise at the statement made by Mr. Mercer, as to the general use of concentrated infusions amongst Chemists. As a dispensing Chemist he must say he never practised such a system.

Mr. Walker believed Mr. Mercer's statement to be correct, that concentrated infusions were very extensively used by dispensers.

Dr. Nevins was of opinion that such a substitution was quite unjustifiable, and he was sure that medical men when they ordered infusions always expected their prescriptions would be dispensed with freshly made ones. As far as he had paid attention to the subject, his impression was against the use of concentrated infusions.

Mr. Walker said he did not mean that dispensing Chemists used concentrated infusions regularly, but only in cases of emergency, when they had not time to make fresh ones.

Mr. Mercer regretted not being able to qualify the statement he had made. He must repeat, that there were many dispensing Chemists in whose shops the exception was to make fresh infusions, the rule to use concentrated ones.

During the discussion the Chairman opened two bottles of Pharmacopœia infusions, which had been prepared in November, according to Mr. Redwood's plan, and they were found still to be quite sweet and fresh.

Mr. Mercer placed on the table a sample of oil given to him by Mr. McInnes, which had been imported into Liverpool under the name of *Shark-Liver Oil.* It possessed a peculiar interest in consequence of its low specific gravity. Until now, sperm oil, which has a sp. gr. of .875, was the lightest oil known; but the sp. gr. of this oil was only .866. It gives the usual liver-oil reaction with sulphuric acid. It came from Marseilles, and the shippers state that it was procured from sharks caught on the coast of Africa.

The last Fortnightly Meeting of the session was held on Friday evening, March 2, 1855,

MR. ABRAHAM IN THE CHAIR.

The Secretary announced that during the summer months, commencing March 30, the meetings would be held monthly instead of once a fortnight.

He also acknowledged the receipt of the following donations to the library:—*Journal of the Society of Arts*, contributor unknown; Dr. Healde's *Translation of the P. L.*, 1788; *Translation of the P. L.*, 1815, by a London Physician; Rotheram's *Edinburgh Dispensatory*, 1797; and Duncan's *New Edinburgh Dispensatory*, 1806, presented by Messrs. J. H. and S. Johnson.

Mr. Mercer presented the Society with specimens of Natron from the East Indies; flowers and leaves of the Tilia Europœa, or Lime-tree; and a very coarse kind of sugar made in Mexico. It is in long cylindrical pieces of about one pound weight, and each piece carefully covered with flag leaves. This kind of sugar is highly prized by the natives, amongst whom it is known under the name of *Rappadura*, and the object of covering it so carefully is to keep it from absorbing moisture during the wet season.

The Secretary then read the following series of resolutions which had been agreed to at a meeting of the Council, held the same evening:—

1st. That it is desirable to form in connexion with this Association, a Museum of Materia Medica, &c., including specimens of the various drugs and chemicals em-

ployed in medicine, and also of such other useful products as may be likely to add to the interest of the collection.

2nd. That the Museum be deposited for the present in the Royal Institution, the space required for that purpose having been kindly granted by the proprietors.

3rd. That as the ordinary income of the Association will not admit of such an outlay as will be required for providing suitable cases, &c., a subscription-list be opened for that purpose, to which the Members and friends of the Association are invited to contribute.

4th. That a Museum Committee be appointed at the first meeting of the Council after the Annual Meeting in each year, to consist of five Members of the Council (three to form a quorum), who shall make all the requisite arrangements for the reception and classification of specimens, and shall have the expenditure of the fund referred to in the third resolution, subject to the approval of the Council.

5th. That Messrs. E. Evans, Abraham, Sumner, Walker, and Mercer, form the Museum Committee until the next Annual Meeting.

6th. That the assistance and co-operation of all parties favourable to the object in view (whether Members of the Association or not) be earnestly requested, and will be gratefully received; and that a list of subscriptions and of specimens presented to the Museum be read at each meeting of the Association, and published in the *Pharmaceutical Journal.*

7th. That it be an instruction to the Committee not to incur any expenditure until the amount of £50 has been subscribed to the Museum Fund.

After reading the resolutions, the Secretary made a few remarks urging upon the Members the necessity of an energetic and united effort being made, to ensure the formation of a Museum which should be worthy of the town and a credit to the Liverpool Chemists' Association.

Dr. Edwards then delivered an interesting lecture on "Iodine and its Preparations."

EARLY CLOSING ASSOCIATION, LIVERPOOL.

A very large and influential body of Chemists, chiefly resident in the South District, held a meeting on Tuesday evening last (February 20th), at Wilde's American Hotel, Great George Street, to consider the propriety of closing their shops at nine o'clock P.M.

A deputation from the "North End Early Closing Association" attended.

Mr. Abraham (Bold Street) presided, and, after opening the meeting, requested gentlemen present to move the several resolutions.

The meeting was subsequently addressed by Messrs. Shaw, Rawle, Alpass, Mackinlay, Cox, Flinn, Dr. Edwards, and others; ultimately the following resolutions were unanimously carried:—

I.—"That the Chemists and Druggists now present do pledge themselves to close their shops on and after the 1st of March, at nine o'clock every evening (Saturday excepted), and undertake that, as far as possible, no appearance of evasion of this engagement shall occur."

II.—"That the said gentlemen do individually agree to sustain the aforesaid resolution by appending their names to the agreement drawn up for that purpose, it being understood that any gentleman is at liberty to withdraw his signature by giving a month's notice to the Secretary, with an explanation of his reasons."

III.—"That placards and handbills be printed giving due notice to the public, and announcing that the change will take place on and after the 1st of March."

IV.—"That a friendly meeting be held occasionally, and a permanent Committee formed of the following Members, to carry out the object of this meeting:—Mr. Abraham, President; Mr. Alpass, Mr. Shaw, Mr. Watson, Mr. Mackinlay, Mr. Moss, Mr. Broome, Mr. Aspinall, Jun., Mr. Wright, Mr. Green, Mr. Walker, Dr. Edwards, Mr. Howell. Mr. Rawle, Treasurer; Mr. William H. Fisher, Hon. Secretary. With power to add to their numbers."

V.—"That a subscription of two shillings and sixpence from each Member be solicited for defraying expenses."

An agreement was accordingly drawn up, which was numerously signed:—

"We, the undersigned, Chemists and Druggists, do pledge ourselves to close our shops on and after the 1st day of March, at nine o'clock every evening (Saturday

excepted), and undertake that, as far as possible, no appearance of evasion of this engagement shall occur."

Signed by almost all Chemists, &c., in the South District of Liverpool.

At the present time only *two* Chemists keep their shops open after nine o'clock P.M.

The new regulation appears to work admirably. Fortunately the *two* dissentients are parties whose actions do not affect the other members of the trade. The public also (at least the respectable public) appreciate the consideration which the (early closing) Chemist has for his Assistant, Apprentice, or both, as the case may be, and endeavour to assist him by obtaining their medicines (as much as possible) during the hours of business.

Beside the advantages accruing from this Association, morally, mentally, and physically, it also affords opportunities for its Members to associate with one another, and thereby generate good feeling and cordiality amongst them, giving opportunities for all to promote the interests of their profession.

EARLY CLOSING.

TOWN OF PORTSEA.—PUBLIC NOTICE.

At a General Meeting of the Chemists and Druggists of Portsea, held at No. 65, Queen Street, on the 28th day of February, 1855, Mr. Joseph L. Rastrick, Local Secretary of the Pharmaceutical Society of Great Britain, in the Chair, the following resolutions were unanimously passed :—

Proposed by Mr. J. Orange, *seconded by* Mr. W. Rastrick : That the hours usually devoted by Chemists and Druggists to business might be gradually modified, without injury to themselves or to the service of the public.

Proposed by Mr. W. J. Dale, *seconded by* Mr. J. Bigwood : That the hour of ten o'clock at night be adopted for the final closing of the shops, except on Saturdays at half-past eleven, and all gas-lights put out accordingly.

Proposed by Mr. W. Rastrick, *seconded by* Mr. R. H. Rowell : That on Sundays, the hour of half-past ten o'clock in the morning be arranged for closing, till five o'clock in the afternoon, and finally at ten at night. This arrangement to extend to all fast days and general holidays.

In consideration, therefore, of the above resolutions, the public are respectfully informed, that on and after the 12th day of March, 1855, the final hour for closing the shops will be ten o'clock at night, and they are earnestly solicited to apply for medicines, &c., previously to the above-mentioned hour. On Sundays, fast-days, and general holidays, the hours of closing will be half-past ten o'clock in the morning till five in the afternoon, and finally at ten o'clock at night.

(Signed, on behalf of the Meeting),

Portsea, Feb. 28th, 1855. Joseph L. Rastrick, *Chairman*.

ORIGINAL AND EXTRACTED ARTICLES.

CHEMICAL EXAMINATION OF A YELLOW BARK FROM ABEOCUTA, IN WESTERN AFRICA.

BY JOHN STENHOUSE, LL.D., F.R.S.

I am indebted for a quantity of this yellow bark from Abeocuta to the kindness of Frederick Desnaux, Esq., by whom it was imported.

This bark, which consists of pieces of a considerable size, from an eighth to a quarter of an inch in thickness, has an ash-grey colour externally. It is used by the natives of Abeocuta as a yellow dye.

The coarsely powdered bark was exhausted with boiling water, and the aqueous solution evaporated to dryness.

This was next digested with spirit of wine, the greater portion of the alcohol was recovered by distillation, and the residual liquid, on standing for some time, deposited a mass of dark-brown ill-defined crystals. These were separated from the mother-liquor, and after being washed with a small quantity of water, were again re-dissolved in spirit of wine.

The still impure crystals were repeatedly dissolved in water and alcohol

alternately, in order to free them from a resinous substance which adhered to them very tenaciously. When finally crystallized out of hot spirit, they were deposited in groups of tolerably large crystals of a bright yellow colour and silky lustre. These crystals have precisely the same bitter taste as berberine. They are but slightly soluble in cold, but easily soluble in boiling water. They are likewise insoluble in ether, but readily dissolve in alcohol. On the addition of ether to their alcoholic solution they are precipitated. Hydrochloric and the other mineral acids when added to their cold concentrated aqueous solutions, produce crystalline precipitates. Their double platinum salt is a yellow precipitate, which is insoluble in water. The analysis of the platinum salt clearly proves that the yellow crystalline substance from this bark is really berberine. The following are the numerical results of the analysis of the platinum salt prepared at three different periods:—

I.—0.4935 grm. gave 0.0865 grm. platinum.
0.3330 grm. gave 0.5485 grm. carbonic acid, and 0.1185 grm. water.
II.—0.2735 grm. gave 0.0475 grm. platinum.
0.2895 grm. gave 0.4735 grm. carbonic acid, and 0.0925 grm. water.
III.—0.5275 grm. gave 0.0935 grm. platinum.
0.2875 grm. gave 0.4735 grm. carbonic acid, and 0.1015 grm. water.

I subjoin the results of these determinations, along with those obtained by Fleitman,* Bœdeker,† and Perrins,‡ of the same salt.

	Fleitman.		Bœdeker.		Perrins.	Stenhouse.		
	I.	II.	I.	II.		I.	II.	III.
C....	44.44	44.35	—	45.17	—	44.92	44.60	45.10
H....	3.42	3.58	—	3.92	—	3.95	3.55	3.93
—								
—								
—								
Pl....	18.11	—	17.04	17.58	17.55	17.53	17.36	17.72

Except berberine, I was unable to obtain any other crystalline product from the bark. Nothing whatever is known of the tree which produces it; I rather suspect, however, that it will prove to be either a berberis or a menispermum, which belong to the only two natural orders hitherto known to yield berberine.

NOTES UPON THE *MATERIA MEDICA* OF SCINDE.

Among the subjects that engaged the attention of the late Dr. Pereira at the period when sudden illness and death put an end to his labours, was a small collection of the Materia Medica used in Scinde, presented to him by the late Dr. John Ellerton Stocks. A notice of this collection by Dr. Pereira, intended for the *Pharmaceutical Journal*, was even in type at the time alluded to, but as it was incomplete, it was not published.

In the early part of last year, Dr. Stocks having returned to England, we communicated with him, when, learning that he intended to include a notice of the drugs of Scinde in a work upon the arts and manufactures of that country which he was preparing for the press, we reserved the notes that had been written, intending to place them in his hands.

The lamented death of Dr. Stocks in August 1854, having again frustrated the intended notice, we have thought it best no longer to delay placing on record such information as we have been able to collect regarding the Materia Medica of Scinde, as illustrated by the specimens in question.

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* *Ann. der Chem. und Pharm.*, lix., 60.
† *Ibid.*, lxvi., 384; lxix., 40.
‡ *Ibid.*, lxxxiii., 276.

ANIMAL SUBSTANCES.

1. Kuch Kodee. Shells of *Cypræa Moneta.*

2. Kodee Suchee. Shells of *Cypræa Annulus.*

3. Kodee. Small white shells of the genus *Marginella*, pierced and strung in bunches.

These shells were formerly imported from the East, and employed occasionally in European medicine. Pomet has described them as *Porcelaine en coquillage* and has given a good figure, vide *Histoire des Drogues* (1694) part ii., liv. i., p. 97, p. 104.

In Scinde, these shells as well as those of the *Cypræa* are calcined and the powder sprinkled over sores.

4. Kohna nag. Bat's Dung. Forskal. *Mat. Med. Kahirina* in *Descriptiones Animalium* (Hauniæ, 1775, 4to.). It is used in alchemy.

5. Menh wusari. Dr. Stocks states it to be a little red insect of the genus *Mutella*, regarded in Scinde as a *violent* aphrodisiac, and much used as such. See Ainslie *Materia Indica*, vol. ii., p. 117. The specimen was received in bad condition.

6. Peoree (Purree)—Indian Yellow, *Jaune Indien*, Guibourt, *Hist. des Drog.* iv,. p. 91.

In Scinde it is said to be procured from the urine of the cow after eating decayed and yellow mango leaves.

M. Guibourt is doubtless correct in referring the *Masang de Vaca* of Kæmpfer (*Amœnitates*, p. 392) to this substance.

Indian Yellow has been chemically examined by Erdmann and Stenhouse, who found it composed chiefly of a peculiar acid named *Euxanthinic*, or *Purreic Acid* combined with magnesia. See translation of the original notice in *Pharm. Journ.*, vol. iv., p. 417.

7. Peoree. A paler variety.

8. Gooloochund. A mixture of *purree* and sandal-wood, used to produce the yellow forehead-mark of the Hindoos.

9. Puneer mai Shutur. *Pun-eer máyeh shootir*, enumerated in the *Ulfaz Udwiyeh** among the *aphrodisiacs*, also as *Pu-neer-máyeh*, No. 134, translated *Rennet.*

According to a note of Dr. Stocks, it is said to be *coagulated milk* found in the stomach of a young camel after death. It is regarded as a most powerful aphrodisiac and is very expensive.

VEGETABLE SUBSTANCES.

BARKS.

10. Bhojputr. Bark of *Betula Bhojputtra*, Wall. No. 569, *Ulfaz Udwiyeh;* No. 232, *Taleef Shereef.*† It is very thin and papery, and used for writing on.

11. Darsheeshan. No. 884, *Ulfaz Udwiyeh.* This specimen consists of small pieces of a very thick bark, of a deep reddish-brown colour, and highly astringent, acrid and slightly bitter taste. Ainslie says (*Mat. Ind.* ii., p. 152), that this bark is white and bears a strong resemblance to *Canella alba*, which can scarcely be asserted of the specimen from Scinde.

12. Injibar. A brown, fibrous, quilled bark, with but little taste: origin and uses unknown. The same name is applied to Bistort Root. (No. 55.)

13. Kubur Post, according to Dr. Stocks, the bark of *Capparis galeata*, a plant occurring in Scinde. Its bark, in our specimen, is in small irregular curled pieces, of a greyish colour, bitter taste and but little smell.

The bark of several other species of *Capparis* has in various countries been employed in medicine.

EXUDATIONS FROM PLANTS.

14. Chundris. Bombay Animé. *Animé dure Orientale.* Guibourt, *Hist. des Drog.*, tome iii., p. 425.

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* *Ulfaz Udwiyeh, or the Materia Medica in the Arabic, Persian, Hindee, and English Languages, compiled by Noureddeen Mohammed Abdullah Shirazy*, edited by Fr. Gladwin, 4to. Calcutta, 1793.

† *The Taleef Shereef*, or *Indian Materia Medica*, translated by G. Playfair. Calcutta, 1833, 8vo.

This valuable resin is the produce of Zanguebar on the East Coast of Africa, whence it is frequently shipped to Bombay, thence acquiring the name *Bombay Animé.*

15. Decamalee Gum. Certainly produced by *Gardenia lucida*, Roxb.

16. Gum-resin of *Dorema aureum*, Stocks, gathered by Dr. Stocks in Beloochistan. It is an opaque cream-coloured substance, closely resembling in taste, smell and general appearance, the *Ammoniacum* of the shops.

Dorema aureum, a tall umbelliferous plant of Upper Beloochistan, is described by Dr. Stocks in *Hooker's Journal of Botany*, vol. iv., p. 149.

17. Gum-resin of *Ferula orientalis*, Linn., collected in Beloochistan by Dr. Stocks. Semi-transparent, yellowish-brown tears, having a galbanum-like smell, and a strong, bitter, peculiar (parsley-like ?) taste.

18. Gum-resin of *Ferula* ———*?* gathered in Beloochistan by Dr. Stocks. A pale yellow, waxy-looking gum-resin, with a somewhat alliaceous and cubeb-like taste. Neither this substance nor No. 17, resemble any of the fœtid gum-resins of English commerce.

19. Furfyoon. A gum-resin in small fragments, with portions of the stem and capsules of a *Euphorbia*. It is of a deep brown, much darker than the Gum Euphorbium of English commerce.

20. Goon. Gum Sarcocolla.

21. Gunda Biroza or Berchu. A dry, brittle turpentine, preserved in a mussel-shell; it diffuses an aromatic odour when heated. It is employed in Scinde in ointments, for gonorrhœa, &c.

The name *Gunda Biroza* is applied, according to O'Shaughnessy, to the resin of *Boswellia thurifera* as well as to that of *Pinus longifolia*.*

22. Resin of *Juniperus Phœnicea*, Linn. Collected by Dr. Stocks in Beloochistan. A small specimen of a yellow terebinthinous resin.

23. Kuteelo. Gum of *Bombax gossypium*, Linn. *Cochlospermum gossypium*, De C. *Kut-hee-rá.* No. 1277, *Ulfaz Udwiyeh.*

Gomme de Bassora. Guibourt, *Hist. des Drog.*, tome iii., p. 420, p. 579.

24. Saht Kundroo. A mastich-like resin in small tears, the produce of *Pistacia Khinjuk* J. E. Stocks, and of *P. Cabulica* J. E. S., trees of Beloochistan and Affghanistan. It is used in Scinde and Affghanistan for filling decayed teeth. See Kæmpfer, *Amœnitates*, p. 413; *Hooker's Journ. of Bot.*, iv., p. 143.

25. Turunjabeen, according to Dr. Stocks, is manna from *Tamarix dioica*, Roth. *Turen-jee-been.* No. 611, Ulfaz Udwiyeh. "A species of manna, collected at Khoresan from a thorny plant, called *Khár shooter.*"

Guz-ungubeen, No. 1296 of the same work, is described as "a species of manna collected from the tamarisk-tree."

Martiny (*Encyklopädie*, bd. ii., p. 337), and Royle (*Illustrations*, p. 267) refer *Turunjabeen* to *Alhagi Maurorum*, De C.

Our specimen consists of semi-transparent brownish tears, hard, though sticky on the surface, from the size of a pea downwards; they have a pure saccharine taste. Small fragments of twigs, apparently of the tamarisk, are observable among the tears.

FLOWERS.

26. Booeemaderan. Flowers of *Achillea santolina*, L., from Affghanistan. They are in the state of coarse powder and are used as a tonic.

27. Koongoo Taro. Flowers of *Tamarix sp.*, used in dyeing.

FRUITS AND SEEDS.

28. Ahoober. Berries (*galbuli*) of *Juniperus Phœnicea*, L. Larger than common juniper berries and of a reddish-brown colour. *Juniperus Phœnicea* occurs in

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* *Bengal Dispensatory*, p. 283, p. 612. Also, Royle, *Illustrations of the Botany of the Himalayan Mountains*, p. 351.

Affghanistan and Beloochistan as well as in Europe. Its berries are much used in medicine in India.

29. Chaksoo. Seeds of *Cassia absus*, Linn. No. 662. *Ulfaz Udwiyeh.* No. 342. *Taleef Shereef.*

Somewhat flat, shining, black seeds of about a sixth of an inch in diameter. They are employed in all parts of the East against inflammation of the eyes. See Dr. Royle's remarks upon the diffusion of this plant. (*Illustrations*, page 184.)

30. Hub Bulsán. *Hu-bul Bul-sán*, No. 756, *Ulfaz Udwiyeh.*

A resinous little berry, of about the size and colour of a large peppercorn. It is very different from the fruit we know as *Carpobalsamum.*

31. Khakshee. Minute seeds of reddish colour. They are said to be imported into Scinde from Persia.

32. Kulhuttee. The small, flat, pale-brown seeds of some leguminous plant.

33. Mahlib. *Prunus Mahaleb*, Linn.; *Melub*, No. 1362, *Ulfaz Udwiyeh: Goeula, Gewla, Gowla* in the Deccan. Ainslie, *Mat. Ind.*, vol. ij., p. 111. *Amandes de Mahaleb*, Guibourt, *Hist. des Drog.*, ed. 4, tom. iii., p. 292.

Grows at Kelat and elsewhere in Beloochistan and Affghanistan. The fragrant kernels, strung as necklaces, are much valued by the women of Scinde.

34. Mowrt. Berries of *Myrtus communis*, L.; *Mowrid.* No. 1388, *Ulfaz Udwiyeh. Myrtus communis* is indigenous in Beloochistan.

35. Ootungun, according to Dr. Stocks, the seeds of *Acanthodium hirtum. Aotungun.* No. 20, *Taleef Shereef*; No. 472, *Ulfaz Udwiyeh.*

36. Puneer fota. Dried fruits of *Puneeria coagulans*, Stocks. Much used in indigestion, and administered either in infusion or in substance.

37. Kinro. A small cake made of the mucilaginous seeds of *Salvia plebeia*, R. Br. Moistened with water it is used to plaster back women's hair, and to keep it glossy and in its place.

38. Ramputtree, *Myristica*, sp. ——? *Taleef Shereef*, No. 85. A very inferior non-aromatic species of mace, used in cookery.

39. Unab. No. 1185, *Ulfaz Udwiyeh*, where it is rendered *jujubes.* We cannot distinguish this dried fruit from that of *Zizyphus vulgaris*, Lam.

HERBS.

40. Afsunteen. No. 224. *Ulfaz Udwiyeh;* Ainslie, *Mat. Ind.*, vol. i., p. 481; O'Shaughnessy *Bengal Disp.*, p. 414.

According to the last-named author this drug is the produce of *Artemisia Indica*, Willd.

41. Gul Miryem.—*Anastatica Hierochontica*, L.

This is that curious ball-like little plant, known under the inappropriate name of *Rose of Jericho*, which when immersed in water expands its branches in a singular manner, returning to its globular form when dried.

"Des charlatans," says Guibourt,* "profitaient autrefois de cette propriété pour prédire aux femmes enceintes un heureux accouchement, si, mettant cette rose tremper dans l'eau, pendant leurs douleurs, elles la voyaient s'épanouir : c'est ce qui avait presque toujours lieu." It is still employed in this manner in Scinde.

42. Ispruk. A species of *Delphinium* from Affghanistan, in the state of coarse powder. It is used in dyeing.

43. Kashmeeru putl. The broken leaves of *Rhododendron campanulatum*, Wallich.

44. Khurfor. *Seddera latifolia*, Hochst. In the state of coarse powder.

45. Khutso. Leaves and fruits of *Pteropyrum Oliverii*, Jaub and Spach. Used in children's complaints.

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* *Hist. des Drogues*, t. iii., p. 625.

46. Moodheree. *Antichorus depressus*, Linn. fil. Used as a demulcent.

47. Murwo. Tomentose leaves and stalks in coarse powder.

48. Nibo. *Anticharis Arabica*, Endl. Almost in the state of coarse powder. It is used in the washing of silk.

49. Panel. *Pogostemon Patchouli*, Lepelletier. O'Shaughnessy, *Bengal Disp.*, p. 493. *Pharm. Journ.*, vol. iv., p. 80. Hooker, *Journ. of Botany*, vol. i., p. 22, p. 328, tab. xi.

The leaves and stalks of this plant are used in Scinde, as well as in Europe, as a perfume.

50. Sewur. *Rhazya stricta*, Decaisne. Broken leaves, which are used as a bitter and cooling medicine. The plant is a native of Scinde.

51. Zurnib. Broken leaves with fragments of small branches. According to Dr. Royle (*Illustrations*, p. 353) they are those of some species of *Taxus*.

ROOTS.

52. Dried Root of Assafœtida plant, gathered in Beloochistan in 1850, by Dr. J. E. Stocks.

Dr. Pereira has left the following note upon this specimen:—

"9 inches long, 2½ inches in diameter, somewhat tapering; a fibrous tuft at the top. Cortex ash-coloured. Substance internally whitish, very fibrous, like a bundle of thin, white, deal shavings. Odour that of assafœtida."

53. Bahman Soorkh. Red Behen. *Beh-mun*, No. 573, *Ulfaz Udwiyeh.*

Great uncertainty has long existed as to the origin, and even the identity of those once highly valued drugs, the *Red* and *White Behen*. "Nulla res tantam sententiarum diversitatem procreavit, quàm harumce radicum origo," wrote Geoffroy in 1741. Yet earlier than this, the drug seems to have been one of extreme rarity, since the London College of Physicians, in their Pharmacopœia of 1632, exonerates apothecaries from keeping it, by ordering substitutes.

Geoffroy,* Pomet,† Hill,‡ and others, describe *Radix Behen rubri* as a thick root, which has been cut in slices like jalap. Bergius,§ speaks of it as cylindrical, an inch or more in thickness, and occurring cut in pieces of 4 inches or more in length. Matthiolus ‖ has figured *Behen rubrum* as a root of some inches long.

The root received from Scinde consists of irregular pieces, of which the largest is 2 inches long, ¾ of an inch thick, and abruptly tapering to its lower extremity. The exterior is covered with a wrinkled, reddish bark; a transverse section shows concentric marks, the substance of the root being hard and of a pale pinkish hue. It is inodorous, with a slightly astringent taste.

We may add that we have compared it with the root of *Statice Limonium*, L., and also with the root imported from Taganrog to Marseilles, and supposed by M. Guibourt to be the true *Behen rubrum* of the ancients,¶ but do not find it to agree with either.

54. Bahman Sufed. White Behen. *Centaurea Behen*, L.; No. 573, *Behmun. Ulfaz Udwiyeh; Behmen abiad*, O'Shaughnessy, *Bengal Dispensatory*, p. 409.

Under the name of *Bahman Sufed*, we have received from Scinde, pieces of a woody root, ¾ of an inch thick and about two inches long. They are whitish, strongly wrinkled longitudinally, inodorous and almost devoid of taste.

White Behen is currently referred in works on Materia Medica to *Centaurea Behen*, L., a plant common at the foot of Mount Lebanon, as well as in other parts of the East.

55. Injibar. Bistort Root. Used in hæmorrhage.

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* *Tractatusde Mat. Med.*, t. ii., p. 18.
† *Hist. des Drog.* Paris, 1694. Fol. Liv. i., chap. xxviii.
‡ *Hist. of the Mat. Med.* Lond., 1751. 4to. p. 629.
§ *Mat. Med.* Stockholm, 1778. 8vo. T. i., p. 248.
‖ *Commentarii.* Basil. 1674. 4to. p. 858.
¶ *Hist. des Drog.* t. ii., p. 416.

56. Irsa ——— ? *Iris* sp. Orris root.
Royle, *Illustrations*, p. 372 ; Ainslie, *Mat. Ind.*, vol. i., p. 284; Ulfaz Udwiyeh, No. 197.
Although the word *Irsa* is rendered *Orris Root*, it represents a substance but little resembling the *Radix iridis Florentinæ* of the English shops. Our sample of *Irsa* consists of pieces of a root of the thickness of the finger, covered more or less with the bark, and internally darker, harder, and less fragrant than the *Florentine Orris.*
Ten packages of this East Indian Orris Root were offered for sale in London, in 1852.

57. Jadwar. Consists of irregular, cut pieces of a large fleshy root; they are hard, black, shrunken, and possessing but little taste and smell. The largest piece is about 3 inches long by 1 inch broad. A decoction treated with iodine gives abundant evidence of starch.
The same name is also applied to Zedoary. See Dr. Royle's observations on this subject in his *Illustrations of the Botany of the Himalayan Mountains*, p. 49.

58. Kapoor Kuchree. Rhizome of *Hedychium spicatum*, Smith.
Kaphoor Kutcherie, Taleef Shereef, No. 533. *Radix Hedychii spicati* Martius. *Ostindische Rohwaarensammlung der Friedr.-Alex.-Universität zu Erlangen.* 1853. p. 9.
Irregular segments of a strongly aromatic rhizome, internally white like ginger, externally covered with a reddish-brown bark.

59. Koolinjan. Rhizome of *Alpinia galanga*, Linn. *Radix galangæ majoris.* Pereira. *Elem. of Mat. Med.*, ed. 3, vol. ij., p. 1141. This is the *Galanga major* of pharmacologists, and not the ordinary *Galangal root* of English commerce. It is well represented in Bauhin's edition of Matthiolus (Basil., 1674, page 23) ; as well as in Professor Guibourt's *Histoire des Drogues* (ed. 4, tome ij., p. 201, fig. 99.) Consult also Roxburgh's *Flora Indica* (Serampore, 1832, 8vo.) vol. i., p. 59.

60. Koot. Root of *Auklandia Costus*, Falconer; Kust. No. 1245, *Ulfaz Udwiyeh.* See an excellent account of this root, with a figure, in Guibourt's *Histoire des Drogues*, ed. 4, tome iij., p. 25; also *Pharm. Journ.*, vol. iii., p. 401.

61. Kurwo. Small sticks of the thickness of a goose-quill, having a bitter taste. Its origin is wholly unknown.

62. Mahmira, Root of *Coptis Teeta*, Wallich. Nat. ord. *Ranunculaceæ.* Pereira in *Pharm. Journ. and Trans.*, vol. xi., p. 294.
Professor Guibourt has given some excellent engravings of this root under the designation of *Racine de Chynlen ou de Mangouste* (*Hist. des Drog.*, ed. 4, tome ij., pp. 526, 7, 8, figs. 229, 230.)

63. Mooslie Sufed, White Mooslie. The root, according to O'Shaughnessy, of *Bombax Malabaricum* De C. (*Bengal Dispensatory*, p. 227.)
Our sample of White Mooslie consists of dried and shrivelled tubers 1 to $1\frac{3}{4}$ inches long and about $\frac{1}{4}$ of an inch thick; of a pale yellowish-brown, inodorous, and mucilaginous and insipid when chewed. Dr. O'Shaughnessy states that it contains 60 per cent. of gum, 15 of starch, with traces of resin, the remainder being woody fibre. He adds that the powdered root forms a thick mucilage with cold water, and answers admirably as a nutritious demulcent for convalescent persons.
According to the same author, both the Black and White *Mooslie* are extensively used as remedies by the natives of India.

64. Mooslie Sujah, Black Mooslie, Root of *Murdannia scapiflora*, Royle ; of *Curculigo orchioides*, Roxb., according to Ainslie, *Mat. Ind.*, vol. ij., p. 242.
Dried slices of a blackish root of about half an inch thick.

65. Root of *Rheum Ribes*, L., gathered by Dr. Stocks in Beloochistan, 1850. We have received no information whether this species is collected for medicinal purposes.

66. Shikakul. Segments of a pale-coloured fleshy root, having a sweetish taste. In the *Ulfaz Udwiyeh* it is translated *Wild Carrot.*

67. Soorinjan, *Colchicum* sp. *Hermodactyli.* Narrow, yellowish-white *cormi*, 1 to $1\frac{1}{2}$ inches in length, having a slightly bitter taste.

68. Tootia Haroonee, or Haron Tootia. Grows beyond Cabul towards Bamian, J. E. S.

A fern rhizome ?

MISCELLANEA.

69. Kungoo. A red powder used, like No. 8, for the forehead marks of the Hindoos. It is made by steeping Tumeric Root in an alkali.

70. Rusoot. Extract of *Berberis Lycium*, Royle; No. 796, *Ulfaz Udwiyeh*; O'Shaughnessy, *Bengal Dispensatory*, p. 203.

A watery extract prepared from the root and branches of *Berberis Lycium*, Royle (*Illustrations*, p. 63). It has for ages been usefully employed in the East in cases of ophthalmia. See an interesting paper, by Dr. J. Y. Simpson, "*On some ancient Greek Medical Vases for containing Lykion*," in *Pharm. Journ. and Trans.*, vol. xiii., p. 413.

71. Sakun. Small, rounded, astringent galls of a species of *Tamarix*. Dr. Royle states them to be formed in India upon the twigs of *T. Indica* and *T. dioica*, and in Egypt upon *T. Furas* and *T. orientalis*.* Martius considers them the produce of *T. articulata*, Vahl.† The galls are used both in medicine and dyeing.

(*To be continued.*)

SCAMMONY AND COMPOUND COLOCYNTH PILL

BY MR. SOUTHALL.

In reply to the communication of J. R. Collins, contained in the last number of the *Pharmaceutical Journal*, I have to state that, in making the remark that scammony is a mild medicine, I did not intend to imply that it does not act powerfully in large doses. Virgin scammony, in quantity of ten or fifteen grains, the dose recommended by Pereira, would doubtless prove a strong cathartic, but my remarks referred to the very small and disproportionate quantity in which it is combined with aloes in the compound colocynth pill. I speak from experience, when I state that virgin scammony produces no sensible effect in doses of two or three grains, and five or six grains only gently loosens the bowels.

The following is a statement of the respective doses of scammony and aloes, quoted from our principal authorities :—

	Scammony.	Aloes.
Phillips	gr. v. to ℥j.	..... gr. ij. to xv.
Christison	gr. x.	..... gr. v. to xx.
Thomson	gr. v. to xv.	..... gr. ij. to x.
Pereira	gr. x. to xv.	ordinary dose, gr. v.

The minimum doses (including one of each article, where a specific quantity only is stated as the dose) added together, give scammony 30, aloes 14, and yet they are combined in the compound colocynth pill in the proportion of three of aloes to one of scammony.

The alteration I suggested in the proportion of these ingredients, has, it may be noticed, this recommendation, that while the quantity of scammony is increased 50 per cent., that of aloes is diminished only about 16 per cent., the amount of the two together remaining the same. This would be, I think, a great gain with little loss.

I do not agree with J. R. Collins in the suggestion he has quoted respecting the use of resin of scammony, believing there is generally a disadvantage in separating the elements of gum resins, and I would rather use good virgin scammony than the same amount of the extracted resin.

* *Illustrations of the Botany of the Himalayan Mountains*, p. 214.

† *Ostindische Rohwaarensammlung der Universität zu Erlangen*, p. 34.

THE FRANKINCENSE TREE OF WESTERN AFRICA.
(*DANIELLIA THURIFERA*, BENNETT.)

See page 400 of last month's Journal.

[This cut was intended for insertion with Dr. Daniell's paper in last month's Journal, but was not ready in time.]

PRACTICAL RULES AND RECIPES IN ELECTRO-DEPOSITION.

BY GEORGE GORE, ESQ.

1. In our former articles upon the *principles* of electro-deposition (*vide Pharmaceutical Journal* for July, 1853, and April, 1854), we brought forward a considerable number of instances both of deposition and non-deposition, and from their consideration we drew a number of conclusions as to what substances and what arrangements and conditions of those substances really existed in all cases of deposition and in similar cases of non-deposition.

2. Our object then was, not to obtain practically useful deposits, *i.e.* commercial results, but simply to *acquire knowledge*, to know the conditions or causes and preventives of deposition, and that object was attained as much by negative as by positive results, by making us as familiarly acquainted with the preventives of deposition as with its causes, and thus teaching us what to avoid as well as what to provide in order to ensure success.

3. Now in the *practical* part our object is different; it is to *use* or *apply* the knowledge we have obtained, in the form of practical rules and manipulations, in order to produce practically useful deposits, and by excluding as far as possible all the preventives of deposition, to obtain the greatest possible degree of success.

4. The practical rules and suggestions are very numerous, and to facilitate the understanding and remembrance of them we will commence with those of the most general character, and gradually proceed from them to those of a more special character, amplifying and dwelling more and more upon the minuter points as we proceed, until, in the latter part, we give all the minute points of manipulation necessary to produce the most complex and difficult practical results. In every case where we wish to produce deposition, there must be a *complete circuit* of substances; there must be a *liquid* in the circuit, and the metal to be dissolved, and the article to be coated must be immersed in that liquid.

5. There must also be some source of depositing power, *i.e.* the "axis of forces," such as a voltaic battery or magneto-electric machine; and we must be careful not only to provide all the conditions which would cause successful deposition, but be equally careful to exclude all those circumstances which would prevent or interfere with it.

6. The "axis of forces" must be "equal in power," and circulate "in opposite directions," *i. e.* we must connect one end of the battery with one plate of the depositing vessel, and the other end with the other plate, in order to allow those forces to circulate.

7. Apparently, the most philosophical positions of the plates in the depositing vessel is the horizontal, with the dissolving one above and the receiving one or the receiving article beneath, because the acid set free at the lower one, being lighter, tends to ascend; and the metallic salt formed at the upper one being heavier, tends to pass downwards, and thus keep the liquid uniform and assist the general action; if those positions are reversed, the lower part of the liquid becomes oversaturated with the salt formed there, which crystallizes upon the dissolving plate and stops the action, and the upper part being gradually deprived of all its metal by deposition, yields after a while a bad deposit, and ultimately no metal at all. In practice, however, the horizontal position with the dissolving metal above does not succeed, because the metals used for dissolving are never pure, and their impurities fall upon the surface of the article beneath, and in addition to this the position of the article prevents our being able to examine it readily or to remove it conveniently. The best practical position is the vertical, the dissolving metal and the receiving article being suspended in the liquid facing each other, the latter being rather the lowest in position, and both wholly immersed, and the liquid being stirred occasionally, or the articles kept in motion, in order to keep the liquid uniform.

8. If the article to be coated has a very irregular outline, it is necessary to bend the dissolving plate somewhat to its form, so that the two may be nearly equally distant at all parts, and thus produce a nearly uniform thickness all over.

9. The nearer the receiving article is to the dissolving plate the more rapid is the deposit, and a large body of liquid deposits more rapidly and evenly than a small one. Large connecting wires also admit of a more copious deposit than small ones.

10. Although motion of the articles improves the uniformity of the deposit by keeping the liquid more uniform, yet I have found repeatedly by experiment that at the commencement of deposition it slightly decreases the depositing power: thus, if a uniform depositing liquid contains two metals in solution, and a current of electricity be passed through it of sufficient power freely to deposit one of them in the reguline state, and just sufficiently strong to cause the deposition of the other with it as an alloy, and the strength of the current be slightly decreased *by any means*, the former metal will alone be deposited. Under such circumstances motion of the receiving articles will have the same effect, it will diminish the power, and cause only one metal to be deposited. The diminution of power, however, is very small, and, under ordinary circumstances, it is not observable; motion of the dissolving metal alone has the opposite effect.

11. The influence of temperature is much more marked than that of motion, and the almost invariable rule with regard to it is that it is better to work with the depositing liquid hot than cold, because the action is then very much more free. In a long series of experiments (not yet published) which I undertook in order to ascertain the thermo-electric properties of liquids, I found that the depositing power was almost invariably increased by keeping the dissolving metal hot and the receiving article cold by means of a peculiar apparatus; contrary effects resulted from a contrary arrangement of the temperatures.

12. The general rule with regard to the influence of light is, to avoid all liquids which are decomposed by its influence in such a way as to deteriorate them for depositing purposes; such, for instance, as the sulphite and hyposulphite of silver plating solutions. We have seen that in every case of deposition, nearly the whole of the results are due to the circulation of electric forces through the liquids; and that the quantity and quality of the deposited metal depends upon the quantity and intensity of these circulating forces.

13. To ensure the perfect circulation of the electricity, we must be always very careful to see that the circuit is complete, and that it is capable of freely conducting electricity throughout, that the articles to be coated are conductors of electricity as well as the dissolving plates, and that their surfaces as well as the ends of the various wires at all the points of contact are perfectly clean.

14. For connecting wires, copper is the most suitable metal, because it is one of the best conductors and not expensive; next to it we should select brass; silver is the best conductor, but it is too expensive. Of liquids, the following are among the best conductors: dilute mineral acids; aqueous solutions of salts of copper, silver, gold, ammonia, potash, and soda; and in depositing the noble metal, aqueous cyanide of potassium is one of the best conductors.

15. Much confusion has arisen in the minds of amateurs in the art, also failures in their experiments, from the terms positive and negative *pole*, and positive and negative *plate* of the battery; and to prevent this I would impress upon them the necessity of remembering, that the positive pole is always the negative plate, and the negative pole the positive plate. Thus the zinc is always the negative pole and the positive plate, whilst the silver or copper, as the case may be, is always the positive pole and negative plate; it is further important to remember the direction of the current, as it explains the meaning of the words *pole* and *plate;* also, that when we say "the current," we always mean the stream of positive electricity; although we have as much reason to believe that there is a stream of negative electricity proceeding one way, as of positive

electricity proceeding the opposite way; "the current" always proceeds from the zinc plate through the liquid to the copper or silver; and from that, by means of the screws, wires, and depositing vessel, &c., back to the zinc; thus the zinc is the positive *plate*, because it generates the positive electricity, and the silver or copper is the positive pole, because the positive electricity is supplied from its binding screw and wire into any depositing vessel or other apparatus connected with it; the negative pole and plate are *vice versâ*.

16. In the depositing vessel it is the dissolving piece of metal which is called the positive plate, because it corresponds to the zinc or dissolving plate of the battery, whilst it is the receiving metal which is called the negative plate; the term *pole* cannot be properly applied here, because a depositing vessel possesses in itself no power of generating a current of electricity, and consequently no inherent electric polarity.

17. The article to be coated must always be connected with the zinc of the battery, and the metal to dissolve be connected with the copper or silver.

18. The chemical rules are, that the depositing liquid must always contain a metallic salt; that the metal to be dissolved must always be capable of combining with the elements of the liquid; that the salt formed at the surface of the dissolving metal by the combination of that metal with the elements of the liquid must be soluble in the liquid; that the liquid must contain free acid, or other combining material, beyond that actually belonging to the chemical composition of the salt, and that there must be an excess of water or other solvent beyond that actually necessary to dissolve the salt or salts.

19. In coating articles by simple immersion or wash process, as in wash silvering, water gilding, &c., the article to be coated must be electro-positive to the metal of the liquid in that liquid, and have a stronger affinity for the acid element.

20. In coating articles by immersion, in contact with a piece of zinc or other more positive metal used to cause a deposit, the metal which causes the deposit must be electro-positive to the metal of the liquid in that liquid and have a stronger affinity for its acid, whilst the article which receives the coating must not be electro-positive to any great extent to the metal of the liquid in that liquid, and consequently it will be electro-negative to the metal which causes the deposit. In coating articles by the single cell process, the article must not be electro-positive to any great extent to the metal of its liquid in that liquid, whilst it must be strongly electro-negative to the dissolving metal, each being in its respective liquid.

21. With the battery process, as with the single cell and previous process, the article must not be electro-positive to any great extent to the metal of the depositing liquid in that liquid, otherwise it will coat itself by simple immersion, and the deposit put upon it by the battery will probably not adhere; as for instance, copper coats itself with silver by simple immersion in the ordinary cyanide of silver plating solution, and this effect in the early days of electro-plating offered a considerable obstacle to making the silver adhere upon copper articles.

22. To ascertain if an article is positive or not in a certain solution, clean it well and immerse it alone in the liquid for fifteen or twenty minutes, and if it becomes coated with the metal of the liquid in that period of time, you may rest assured it is rather strongly positive; if it does not coat itself in twelve hours, but comes out nearly or quite as clean as when first put in, you may rest assured that it is scarcely if at all positive, but probably negative. Another way to test it is to connect a wire of the given metal with one pole of a galvanometer, and another wire of the same metal as that dissolved in the liquid with the other pole, and immerse them simultaneously in the liquid; the direction of the deflection of the galvanometer needles will indicate the direction of the current evolved by them, and consequently show which is positive, and the amount of deflection will indicate the degree of positive or negative condition.

23. The following are the rules to be observed in selecting a good depositing

liquid: 1st, it should dissolve the anode freely, and keep it clean, and hold abundance of metal in solution; 2nd, it should possess good electrical conducting power; 3rd, it should yield its metal freely, and in the reguline condition; 4th, it should not act upon common metals to dissolve them, because it is such generally we wish to coat, except when the liquid is required for depositing by the simple immersion or wash process, then it should act upon the common metals, otherwise they will not coat themselves; 5th, it should not decompose by working, or by the contact of the atmosphere, or by the influence of light, in such a way as to injure it for depositing purposes; and, 6th, it should not evolve gas at the surface of the receiving article whilst working, because that generally indicates a waste of the battery power.

24. The way to try a liquid for the battery, single cell, and previous process, is to pass a current of electricity from a single pair Smee's battery through it, with a suitable clean dissolving metal of proper size, and a clean receiving article of common metal of about the same size; and observe how much gas is evolved in the battery, also if the deposit appears quickly and of a bright and proper colour, and adherent to the article; observe also if the article evolves gas from its surface, and if the anode dissolves freely without evolution of gas, work it at intervals, keeping it exposed to light and air, and observe if it works as freely or shows any deterioration, or deposits a sediment, or the anode becomes covered with a thick dirty crust. This latter *may* arise from impurities in the metal; if but little gas is evolved in the battery it is a bad conductor, and will not either dissolve the metal quickly or yield it freely, or it may not have a sufficiency of metal in solution, a sufficiency of free acid; and if the deposited metal is of a bad colour, it may be that your battery power is too great, or the receiving article too small, or that the liquid is incapable of yielding good reguline metal; if the article coats itself by simple immersion in the liquid without the influence of the battery current, it shows that the liquid is better adapted for the wash process than for either of the other processes, and that to adapt it to them the articles made of that particular metal or alloy must receive some previous preparation in order to make the deposit adhere. If it deposits a sediment, or alters in conductibility, by working whilst exposed to the air and light, the probability is, that those influences alter its chemical composition or structure in some way, or it may be that it is not worked in a proper manner; if it evolves gas at the surface of the article by the action of the battery, it shows either that there is too much battery power in relation to the size of the article, or that there is too little metal in solution, or that it is probably a wasteful liquid, one in which part of the current is expended in depositing gas, and probably attended by some decomposition in the solution; except in such a case as the following:—A solution may contain carbonate of ammonia, a little of which is added occasionally; the ammonia being volatile evaporates constantly from the surface of the liquid, and leaves carbonic acid gas dissolved; whenever a current of electricity is passed through such a liquid, abundance of the gas is evolved from the surface of the receiving article, but whether or not this evolution of gas is effected at the expense of a portion of the battery power is at present undecided.

25. Additional rules are required for solutions which are to deposit alloys of two or more metals together in the reguline state. With them the first and chief rule is, that neither of the metals to be deposited must be electro-positive, even to a moderate extent, to the other metal or metals in that liquid. This is best tested by the galvanometer method already described, or it may be tested by immersing each metal separately for several hours in the liquid. If neither of them reduces either of the others separately upon itself in that period of time, we may rest assured that the battery process properly regulated will not deposit them separately; but if either of them is strongly electro-positive to the others, and becomes coated by simple immersion, that one will not be deposited by a

moderate battery current, but only those which are deposited by simple immersion, *i. e.*, only those which are the least electro-positive, have the weakest affinity for the acid or negative elements of the liquid, and are most easily separated from them. This I have proved by the following and many more experiments:—

Exp. 1.—With an alloy solution consisting of equal measures of a strong aqueous solution of protochloride of tin and terchloride of antimony, with an anode either of tin or antimony (the latter is the most proper), and a copper receiving surface, and one pair small Smee's battery, only antimony was deposited. Tin coated itself with antimony in this liquid by simple immersion, and was found to be strongly positive to antimony in it by the galvanometer.

Exp. 2.—With a solution composed of equal measures of aqueous protochloride of tin and chloride of bismuth, and either bismuth or tin anode, and brass cathode, and one pair small Smee's battery, only bismuth was deposited. Tin was positive to bismuth in this liquid by the galvanometer, and coated itself quickly with that metal by simple immersion.

Exp. 3.—With equal measures of terchloride of antimony and chloride of bismuth, antimony anode, copper cathode, and feeble Smee's battery, only antimony was deposited. Bismuth coated itself slowly with antimony by simple immersion in this liquid, and was moderately positive to antimony in it by the galvanometer.

Exp. 4.—With 100 grains of chloride of zinc, and 100 grains of protochloride of tin, dissolved together in one ounce of distilled water, tin anode and copper cathode, and one pair small Smee's battery, only tin was deposited. Zinc was positive to tin in this liquid by the galvanometer, and deposited tin upon itself by simple immersion.

Exp. 5.—With equal measures of strong aqueous solutions of nitrate of zinc and ernitrate of bismuth, and a little nitric acid, bismuth anode, copper cathode, and feeble battery, only bismuth was deposited. Zinc was strongly positive to bismuth in this liquid by the galvanometer, and coated itself quickly with that metal, by simple immersion.

Exp. 6.—With an aqueous solution of the mixed sulphates of zinc and copper, copper anode and cathode, and a single small battery, copper alone was deposited. Zinc was strongly positive to copper in this liquid by the galvanometer, and coated itself quickly in it with copper, by simple immersion.

Exp. 7.—This appears to be an exceptional case. 130 grains of protosulphate of iron and 143 grains of sulphate of zinc were dissolved together in one ounce of water, a feeble battery was employed with copper cathode, and both with iron and zinc anode; zinc only was deposited. On testing with the galvanometer the zinc was found to be positive to iron, but very feebly so, and zinc did not coat itself with iron in it by simple immersion.

26. Further: if we take some distilled water and dissolve some pure caustic potash in it, and pass a moderately strong current through it by platinum electrodes, hydrogen gas will alone be deposited at the cathode. In this case, also, the least positive of the two positive elements of the liquid, potassium and hydrogen, viz., the hydrogen, is deposited: if we now add a little sulphuric acid to the liquid to convert the potash into sulphate of potash, and add some sulphate of zinc besides, and pass a *weak* current through, we shall obtain only a deposit of zinc on the cathode: but if the power of the battery is increased, hydrogen will also be evolved with the zinc. In this case we cannot determine by the galvanometer which is most positive, hydrogen or zinc, because the former is a gas; but it is probable that in those circumstances hydrogen is positive, especially as zinc does not evolve hydrogen, by simple immersion, in such a liquid, as it would do if it was very positive to that substance: if we further add to this liquid even a small quantity of sulphate of copper, and treat it as before, neither potassium, hydrogen, or zinc, will be deposited, but only copper; and we find by the galvanometer that zinc is positive to copper in such

a liquid, and coats itself with that metal by simple immersion. In this case, also, only the least positive of the positive elements of the liquid is deposited.

27. From these and many other experiments which I have tried with similar results, I deduce the following rule:—If a liquid contains several metals or other electro-positive substances in solution, and a *weak* electric current is passed through it, only that substance which is the least electro-positive, and which has the weakest affinity for the acid or negative elements of the liquid, will be separated from its acid and be deposited.

28. With regard to the influence of the proportion of the ingredients of the liquid, and the strength of the current, we may observe, that if a liquid contains several metals, or positive substances, in equal proportions in solution, and only one metal is being deposited by passing a weak current, a considerable increase in the strength (either in quantity or in intensity) of the current will cause a portion of the next more positive metal or substance to be deposited along with the less positive one, but the deposit will probably be not very coherent, because the power required to deposit the second metal in a reguline state will be so great as to deposit the first as a soft powder: this holds most true in cases where the difference of battery-power required is the greatest. For instance, if small quantities and equal proportions of sulphate of zinc and sulphate of copper are dissolved in a large quantity of water, and a feeble current is passed through it, only reguline copper will be deposited, but if the battery-power is increased, either by increase of number or surface of plates, the deposit of copper will cease to be reguline, and zinc will be deposited along with it; and if the power be still further increased, hydrogen will also be evolved from the receiving-plate. Or if we take a small quantity of sulphate of copper and a large quantity of sulphate of zinc, dissolved in a large quantity of water, and pass a strong current through it, the two metals will be deposited together as a non-coherent powder, and hydrogen gas will be evolved. Here again the small proportion of the less positive metal copper, and the great strength of the current, together contribute to the deposition of the more positive substances—zinc and hydrogen.

29. Or if we take a lump of caustic potash, slightly moistened with pure water, and pass a moderate current through it by platinum electrodes, it will be fused into the liquid state, and hydrogen gas will alone be evolved; but if we pass a very powerful current through, potassium will be deposited upon the cathode along with the hydrogen: here again we find that when the current is not too strong the least positive substance will alone be deposited; but if the power be sufficiently increased, and there be only a small proportion of the less positive substance present, the more positive substance, even though it be very much more positive, will be deposited. Thus the weaker affinities always give way first and to the greatest extent, the current of electricity passing through the salt of the least positive base or metal first, and in the greatest proportion.

30. I have found by experiment that if a solution contains several metals dissolved, and a current is passed through it, the tendency of the other metals to be deposited will be increased by all the following circumstances:—1st, by increasing the intensity of the current; 2nd, by increasing its quantity; 3rd, by decreasing the size of the cathode, or increasing the size of the anode; 4th, by decreasing the separating distance of the electrodes; 5th, by keeping either the anode hot or the cathode cold; 6th, by keeping the anode in motion and the cathode at rest; 7th, by increasing the quantity of the more positive metals in the solution, or by decreasing the quantity of the less positive ones; and, 8th, by adding to the liquid an acid or salt which acts strongly upon the less positive metals, and not upon the more positive ones, thus making the former more positive.

PREPARATION OF CALOMEL IN THE WET WAY.

Wöhler* considers that the behaviour of chloride of mercury with sulphurous acid, observed by Vogel, is applicable to the production of calomel on a large scale, and would obviate the necessity for difficult, troublesome, and dangerous operations now adopted.

When prepared in this way it is a very fine, brilliantly white powder, but crystalline, like the sublimed calomel, and there is no doubt of equal medicinal efficacy. With a hundred-fold magnifying power the crystals may be recognized; they are sharp, and generally grouped in regular crosses.

Calomel would be prepared in this way by passing sulphurous acid gas into a saturated solution of commercial bichloride of mercury at a temperature of 122° F., the gas being generated from a mixture of broken charcoal and sulphuric acid. The separation of calomel commences at once. When the liquid is saturated with the gas it should be digested for a while, then allowed to cool, the calomel collected and washed. A little undecomposed bichloride is generally present in the filtrate, and further experiments are required to ascertain what temperature is most favourable for its perfect conversion into calomel.

ON THE PROPERTIES OF THE ORDEAL-BEAN OF OLD CALABAR, WESTERN AFRICA.

BY ROBERT CHRISTISON, M.D., V.P.R.S.E.,
Professor of Materia Medica in the University of Edinburgh, &c.†

(*Read before the Royal Society of Edinburgh, Feb.* 5, 1855.)

Various travellers, and other authors on the manners and customs of the Negro tribes of Western Africa, make mention of the ordeal by poison as a mode of trial in that part of the African continent, when a suspicion arises of the commission of one of the more heinous offences. Of these none seems more frequent than the offence of effecting death or other injuries by means of witchcraft — a crime so held in abhorrence, that the accused will often himself demand the ordeal, rather than lie under suspicion. We have no right, however, to express any astonishment at this folly of the benighted pagan African, when we reflect how short a time has gone by since witchcraft was generally believed in throughout civilized Christian Europe; and when the only way of meeting a charge, no less easy to make than difficult to repel, was by undergoing an ordeal of some kind quite as preposterous as that by swallowing a deadly poison.

The ordeal-poison of the native tribes on the River Gambia appears to be the bark of a leguminous tree, which has been described and figured under the name of *Fillæa suaveolens* by MM. Guillemin and Perottet, in their *Flore de Sénégambie* (1830-33, p. 242, tab. 55). This tree is considered by Dr. Hooker and Mr. Bentham, in their *Flora Nigritiana* (1849, p. 329), to be synonymous with the *Erythrophleum Guineënse* of Mr. George Don (*Gard. Dict.*, ii., 424), the bark of which yields, by infusion, the red-water, or ordeal-poison of our Negro colonists around Sierra Leone; and this again has been thought identical, or nearly so, by Mr. Brown, with the *Casa*, or *Cassa*, whose bark was found by Captain Tuckey to be used as an ordeal-poison by the natives on the banks of the Congo River (Tuckey's *Narrative*, Appendix, v., p. 467). It is possible that more than one species of the same genus may be used for the same purpose; but, judging from the bark of the Gambia and Sierra Leone plants in my possession, it is improbable that *Fillæa suaveolens* and *Erythrophleum Guineënse* are the same species.

I have not yet met with a good account of the effects of the red-water tree, or *cassa* tree; and they certainly have not been hitherto examined scientifically, although the subject cannot fail to repay inquiry. The red-water bark would seem, from the statements of Dr. Winterbottom in his *Account of the Native Africans in the neighbourhood of Sierra Leone* (1803, p. 130), to possess the property of causing, in various circumstances, vomiting, purging, paralysis of the limbs, and death. Judging from the quantity which he says is required for the ordeal, it cannot be a very subtile poison. But the bark presented to me by Dr. W. F. Daniell, of the

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* *Annalen der Chemie und Pharmacie*, April, 1854.
† *Monthly Journal of Medicine*, March, 1855.

Army Medical Service, as the bark of *Fillæa suaveolens*, must be energetic; for when a grain or two is tasted, it causes slowly an intense numbness and tingling of the part of the tongue to which it is confined. That which I have received from him as the bark *Erythrophleum Guineënse* has on the contrary a purely astringent taste, without bitterness or subsequent numbness or acrimony. Its texture is also full of a red concrete resiniform matter, probably a kind of kino; which is entirely wanting in the other. Hence, these barks cannot be produced by the same species; so that if there be no mistake about the barks, the two plants must be different species.

According to Dr. Winterbottom, when a culprit is to undergo the red-water ordeal, proclamation is made, and the whole proceedings take place in public before a great concourse of people, among whom the women are conspicuous by their number and their finery. The bark is publicly pounded, and half a pint of powder is switched in water till it froths like soap. After certain ceremonial observances, the culprit drinks repeatedly, and as quickly as possible, a calabashful of the poison, amounting to eight ounces. Sometimes he dies after drinking the fourth calabashful; sometimes he will take twelve before any effect results. If he is seized with violent pains in the bowels, without vomiting or purging, he is declared guilty, and if he recovers he is sold for a slave. Should he vomit and sustain no other injury, he is pronounced innocent. But if the poison cause purging within twenty-four hours, or if he lose the use of his arms and legs, and so cannot run away when liberated, the red-water is said "to be spoiled;" and in that case, too, he is sold into slavery, or a relative for him, if he be himself too old.

I should gladly have examined a poison possessing such properties as these. But, unluckily, the quantity with which I have been hitherto supplied is too small for an adequate experimental inquiry.

Meanwhile I have fallen in with another African ordeal-poison, of much greater energy and interest, and not hitherto mentioned by any author on poisons I have consulted, although prevalently used in a district long accessible to Europeans. The only notice of any kind that I have seen of it, is a short allusion to it by Dr. Daniell, in an ethnological paper in the *Edinburgh New Philosophical Journal* for 1846, p. 319. From such trials as I have made, it seems one of the most singular and intense poisons yet known, and well worthy of a more complete investigation than I have been hitherto able to accomplish.

A few years ago the Rev. Mr. Waddell, missionary in Old Calabar, who lately left Scotland for the third time, to return to Africa in pursuit of his Christian calling, put into my hands two seeds, which he described as the ordeal-nut of the Negro tribes of Calabar, and of whose properties and uses he gave me so singular an account, that I felt great curiosity to investigate its action and chemical constitution. Subsequently, from him and from a mercantile friend in Liverpool, who annually sends a trading vessel to the Gold Coast, and who kindly interested its captain and surgeon in the cause, I obtained successively three small parcels of the seeds. The natives, it seems, regard them with mystery, and reluctantly part with them. It is, therefore, necessary to guard against the chance of deception, and other sources of error. But I have no doubt that I have received the genuine article. For the four several specimens are the same seed; and it eminently possesses the only indispensable property for the trial by ordeal, inasmuch as it is an unerring and terrible poison.

I owe also to Mr. Waddell a collection of documents illustrating the trial by the ordeal-poison, as repeatedly witnessed by himself and his brother missionaries. From these documents it appears, that when a man dies a little out of the ordinary course, it is no uncommon thing to ascribe his death either to poison or to *Ifod*, in Negro English, *free-mason*, that is, witchcraft. Thereupon one, or more, or many, of his relatives come under suspicion; and there is no other way for the poor creatures to clear themselves, than by swallowing, generally in the fetish-house, an emulsion of this dreadful seed. The native belief is, that the innocent vomit and are safe; but that the guilty retain the poison and die. And such is the confidence in the test, and the general detestation of the crime of practising witchcraft, that, when an individual is accused, he commonly demands the ordeal, and is with difficulty denied it. Many an innocent person thus pays the penalty of his rash reliance.

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The ordeal-nut of Calabar, called *Esére* by the natives, is a leguminous seed or bean, about the size of our garden-bean, but thicker. According to one account I have received, it is not produced in the Calabar district, but is floated down the

river from the upper country. This is possible, for it floats in water ; but it is not very likely. According to information communicated to me by Dr. Daniell, it was stated to him by the natives to grow in marshy places near Attarpah and Old-town in Calabar ; and the Rev. Mr. Waddell was informed that the plant is everywhere destroyed by order of the king, except where it is preserved for supplying the wants of justice ; and that the only store of seeds is in the king's custody.

The seed is, I apprehend, quite unknown in Europe. Of several eminent botanists, including Mr. R. Brown, to whom I have shown it, no one has been able to recognize it as a known species. In order to describe it, it has been cultivated at my request by my colleagues, Professor Syme and Dr. Balfour, and both have succeeded. It proves to be a perennial creeper, of the natural family *Leguminosæ*, and closely resembling a *Dolichos*. It has a large root-stock. The fresh plant has a heavy, strong smell, after being some time cut. Though two years old, it has not yet flowered ; and, like other perennial creepers, it may require to form wood for several years longer before it bears flowers. I am therefore unable to describe it further, or to name it.

ORDEAL-BEAN.
The left-hand figure represents it seen edgewise.

It has a hard, brittle, and ligneous tegument, rather rough, and of a brownish-crimson or pale chocolate-brown colour ; but many specimens are ash-grey, apparently from slight mould. The kernels, which weigh from thirty-six to fifty grains, are always in good preservation, and never injured in the slightest degree by insects—a rare occurrence with tropical seeds. They are white and hard, but may be chewed ; and they have the taste of the eatable leguminous seeds, without bitterness, acrimony, aroma, or any other impression on the organs of taste; in fact, they are scarcely, if at all, distinguishable in taste from a haricot-bean. This is a formidable peculiarity, were it possible for the seed to become a familiar poison in Europe. So far as I know, the property in question is peculiar to it, for all other poisonous seeds of the Leguminosæ, with which we are sufficiently acquainted, are bitter. The blandness of its taste is indeed so unusual a character that I was at first misled, and imagined that I had probably got a wrong and harmless seed ; but I soon found that I was much mistaken.

I began a chemical examination of it, with the hope of separating an active proximate principle, which assuredly must exist in it, and will prove to be a poison of appalling subtilty. But with my limited materials success was unattainable ; for leguminous seeds are difficult to analyse ; and in this instance there is the additional obstruction, that at every stage the want of any marked sensible property makes it necessary to perform a physiological experiment on one of the lower animals, otherwise we may follow a wrong direction in the search. All I can say is, that the seed, like others of its natural order, contains much inert starch and legumin, and 1.3 per cent. of fixed oil, also probably inert ; that its active properties may be concentrated in an alcoholic extract, which constitutes 2.7 per cent. of the seed ; and that this extract does not yield a vegetable alkaloid by the more simple of the ordinary methods of analysis.

I shall now proceed to mention what I have observed of the effects of the ordeal-bean on the animal body. These are interesting, energetic, and in some respects peculiar, as it seems to affect directly and violently the functions of the heart, and the exercise of volition over the muscles.

When a poison impresses powerfully both the circulation and some function or functions of the nervous system, it is a matter of great nicety to eliminate the true phenomena, especially by observations upon the lower animals alone.

We know that some poisons, such as strychnia, and the various seeds and barks which contain it, cause, by direct irritation of the spinal chord, violent tetanic spasms of the voluntary and respiratory muscles, without impairing sensation, or enfeebling the heart, or clouding the mental faculties ; and thus they occasion death by convulsive arrestment of respiration. Others, such as the urari poison, and conia or hemlock from which it is derived, cause, by direct exhaustive action of the spinal chord, the opposite state of paralysis of the voluntary and respiratory muscles, but still without influencing the heart, or sensation, or the mental powers ;

and so death arises in their instance from arrestment of respiration, by simple paralysis of the muscles which maintain it. Others again, such as atropia or belladonna, the plant which yields it, principally assail the functions of the brain, at first combining stimulus of some with exhaustion of others in the most singular and often grotesque concatenation, but inducing at last a state of profound coma, and as the result of this a universal muscular paralysis ; and thus death ensues, equally as before, from arrestment of the breathing, not however by direct action on the origin of the nerves which govern the muscles of respiration, but indirectly, through an influence on the cerebral functions, exactly as in ordinary apoplexy. We can likewise conceive a poison to possess only a simple and direct action upon the heart, producing exhaustion of its irritability, paralysis, and consequently death, by arrestment of the circulation ; but no such poison is yet known.

These are all instances of simple action on a single vital function. But many poisons exert a more composite action. Some, such as nicotina, and its source, tobacco, produce paralysis of the heart, and also a narcotic action on the brain. Others, such as foxglove, and in all probability its active proximate principle, digitaline, not only possess this double action on the heart and brain, but likewise powerfully irritate the kidneys. Others, such as hydrocyanic acid and picrotoxa, the active constituent of cocculus-indicus, exhaust the functions of the brain, so as to induce coma, and at the same time irritate the spinal chord, so as to excite convulsions ; and thus, here again we have death produced by arrestment of the breathing, indirectly through the brain, but concurrently with direct spinal irritation. In others, such as aconitina, and its source, monkshood, there is a singular combination of exhaustion of the heart's irritability, and of common sensation, but without any influence on the voluntary muscles, or on the mental faculties ; and death arises by arrestment of the circulation.

It is easy to see—on considering attentively what must be the manifestations of these various actions, both simple and compound, but especially the latter—that extreme difficulty will often occur in seizing and rightly comprehending the facts, above all when the succession of phenomena is swift, and when the subject of observation is one of the lower animals, which cannot adequately express by external signs the varying influence of agents on sensation and the other cerebral functions.

Hence it arises that many erroneous conclusions have been come to regarding the action of our most potent and interesting poisons. Take for example hemlock. This formidable poison was long supposed to cause death by coma—that is, a narcotic action on the brain. But I have shown in a paper read before this Society in 1836, that the mode of death is really by paralysis of the muscles and arrestment of respiration, through an exhaustive influence on the spinal chord. And it is easy to see where the source of error lay. For, when the muscles are paralysed, sensation and the mental faculties will seem to a common observer to be paralysed also; because the animal mechanism for producing expression is at rest.—It appears that many persons think it an easy task to investigate experimentally the physiology of poisoning. But they are assuredly mistaken. A long apprenticeship must be passed before any one can observe with accuracy the phenomena of the action of poisons.

These cautions are prefatory to the remark, that it is a matter of great nicety to apprehend the deceptively simple manifestations of the action of the ordeal-bean on the lower animals. Scarcely do signs of uneasiness appear after a fatal dose has been given, when the animal becomes in quick succession languid, prostrate, flaccid, immovable; respiration, now faint, speedily ceases; and death is complete. It may thus appear to die insensible and comatose. But that is not the case. So long as the power of expression remains, amidst the swiftly advancing languor, signs of sensation may be elicited. Or we might infer from the phenomena that it dies of paralysis of the voluntary and respiratory muscles. But this, too, is in all probability not the fact. For, on dissection immediately after respiration ceases, the heart is found in a state of paralysis; and it is evident that a quickly increasing paralysis of the heart not only explains the mode of death, but might likewise account for the antecedent muscular weakness and flaccidity.

These effects were well exemplified in the first experiment I tried, when twenty-one grains of fine powder, made into an emulsion with two drachms of water, were secured in a cavity in the subcutaneous cellular tissue of the flank of a rabbit. For three minutes there was no appreciable change. But the animal then evidently became weaker, especially in the hind legs. Its feebleness quickly

increased, and was attended with slight irregular twitches of the muscles of the trunk and extremities, and occasional twitching of the head backwards. But sensation remained; for the animal struggled a little when held up by the ears, and resisted attempts to shove it from behind. In four minutes, when put upon the side, it lay in that position; which the rabbit always vehemently resists so long as it is able. The trunk and extremities immediately afterwards became quite flaccid. Respiration ceased in five minutes certainly—probably indeed sooner; but the precise time could not be fixed, owing to continuance of slight muscular twitches. The chest being immediately opened, the heart was seen pulsating slowly, feebly, and inefficiently for ten minutes; and when its cavities were then perforated, the left side gave out a much brighter blood than the right, showing that the circulation, owing to paralysis of the heart, had not been maintained after respiration had ceased. The muscles of voluntary motion contracted at this time vigorously under the stimulus of galvanism, and continued to do so twenty-five minutes after death.

The same remarkable properties are possessed by the alcoholic extract of the seeds. When two grains and a third of this extract, obtained from one hundred grains of powdered seeds, were introduced into the cellular tissue of a rabbit in the same way as before, at the end of two minutes, without any previous indication, the animal suddenly became weak, fell on its side, struggled a little with its feet, and ceased to breathe in one minute more. On the chest being immediately laid open, the same phenomena were observed as in the last experiment.

It is evident that this poison is one of great intensity of action upon the lower animals; but I have not endeavoured to ascertain exactly its degree of energy. I may mention, however, that on making trial of the exhausted powder from which the extract used in the preceding experiment was prepared, although no effect could be detected in the course of an hour, in ninety minutes the animal was observed to become suddenly weak, and it died in a few minutes more, exactly like the others. This result, which appeared unintelligible at first, was afterwards satisfactorily traced to the residual farina not having been carefully enough washed clear of the second spirituous decoction; so that a little of the poisonous ingredient was inadvertently allowed to remain before the farina was dried. The quantity must have been very small.

The only other fact I have to mention relative to the action of the seed on the lower animals, is one observed incidentally by Mr. Macnab. As the seed vegetates, the two fleshy cotyledons or sarcolobes rise partially above ground. In this state one of the seeds growing in the Botanic Garden stove-house was attacked by two slugs, one on each cotyledon. Mr. Macnab observing that one of them had begun to swell about the head, he removed it for further observation; and in twenty-four hours it was found dead.

Having ascertained the mode of death from the action of the ordeal-bean, I did not consider it advisable to study further the details of its action by means of experiments on animals, because I had been fully informed as to this in a more precise manner by an experiment made with the bean in my own person. I shall conclude this notice with an account of what I experienced; and I trust the details will not appear needlessly minute, as they seem to me to establish an action of a very singular kind in the case of this poison, and one of which we might discover other instances among known poisons, had we equally precise opportunities of determining the true phenomena.

Having some doubts whether I had obtained the true ordeal-poison, as it tasted so like an eatable leguminous seed, I ate one evening the eighth part of a seed, or six grains, about an hour after a very scanty supper. During an hour that I passed in bed reading, I could observe no effect whatever, and next morning I could still observe none. I am now satisfied, however, that a certain pleasant feeling of slight numbness in the limbs, like that which precedes the sleep caused by opium or morphia, and which I remarked when awake for a minute twice or thrice during the night, must have been owing to the poison.

On getting up in the morning I carefully chewed and swallowed twice as much —viz., the fourth of a seed, which originally weighed forty-eight grains. A slight giddiness, which occurred in fifteen minutes, was ascribed to the force of the imagination; and I proceeded to take a warm shower-bath; which process, with the subsequent scrubbing, might take up five or six minutes more. The giddiness was then very decided, and was attended with the peculiar indescribable torpidity over the whole frame which attends the action of opium and Indian hemp in medicinal doses.

Being now quite satisfied that I had got hold of a very energetic poison, I took immediate means of getting quit of it, by swallowing the shaving water I had just been using, by which the stomach was effectually emptied. Nevertheless I presently became so giddy, weak, and faint, that I was glad to lay down supine in bed. The faintness continuing great, but without any uneasy feeling, I rung for my son, told him distinctly my state, the cause, and my remedy—that I had no feeling of alarm, but that for his satisfaction he had better send for a medical friend. Dr. Simpson, who was the nearest, reached me in a few minutes, within forty minutes after I ate the seed, and found me very prostrate and pale, the heart and pulse extremely feeble and tumultuously irregular; my condition altogether very like that induced by profuse flooding after delivery; but my mental faculties quite entire, and my only sensation that of extreme faintness, not, however, unpleasant. Dr. Simpson judged it right to proceed at once for Dr. Douglas Maclagan as a toxicological authority, and returned with him in a very few minutes.

In his absence, feeling sick, I tried to raise myself on my elbow to vomit, but failed. I made a second more vigorous effort, but scarcely moved. At once it struck me—"This is not debility, but volition is inoperative." In a third effort I was more nearly successful; and in the fourth, a resolute exercise of the will, I did succeed. But I could not vomit. The abdominal muscles acted too feebly; nor were they much aided by a voluntary effort to make them act. I then gave up the attempt, and fell back, comforting myself with the reflection that vomiting was unnecessary, as the stomach had been thoroughly cleared. At the same time the sickness ceased, and it never returned. There were now slight twitches across the pectoral muscles. I also felt a sluggishness of articulation, and, to avoid any show of this, made a strong effort of the will to speak slowly and firmly, through fear of alarming my son, who was alone with me.

Dr. Maclagan, on his arrival, thought my state very like the effects of an overdose of aconite. Like Dr. Simpson, he found the pulse and action of the heart very feeble, frequent, and most irregular, the countenance very pale, the prostration great, the mental faculties unimpaired, unless perhaps it might be that I felt no alarm where my friends saw some reason for it. I had, in fact, no uneasy feeling of any kind, no pain, no numbness, no prickling, not even any sense of suffering from the great faintness of the heart's action; and as for alarm, though conscious I had got more than I had counted on, I could also calculate, that if six grains had no effect, twelve could not be deadly, when the stomach had been so well cleared out.

Presently my limbs became chill, with a vague feeling of discomfort. But warmth to the feet relieved this, and a sinapism over the whole abdomen was peculiarly grateful when it began to act. Soon afterwards the pulse improved in volume but not in regularity. I was now able to turn in bed; and happening to get upon the left side, my attention was, for the first time, directed to the extremely tumultuous action of the heart, which compelled me to turn again on the back, to escape the strange sensation. Two hours after the poison was swallowed, I became drowsy, and slept for two hours more; but the mind was so active all the while, that I was not conscious of having been asleep. On awaking, the tumultuous action of the heart continued. In an hour more, however, I took a cup of strong coffee; after which I speedily felt an undefinable change within me, and on examining the condition of the heart, I found it had become perfectly and permanently regular.

For the rest of the forenoon I felt too weak to care to leave my bed; and on getting up, after a tolerable dinner, I was so giddy as to be glad to betake myself to the sofa for the evening. Next morning, after a sound sleep, I was quite well.

On considering this narrative, as well as the experiments on the rabbit, it will appear evident that one principal action of this extraordinary poison, and the immediate cause of death in fatal cases, is depression, ending in paralysis, of the heart. I think it may be also safely inferred, that another action is paralysis of the voluntary muscles, attended with suspension of the influence of volition. It does not appear to me that mere faintness is adequate to account for the extreme muscular inability I experienced; neither do I conceive it possible for me to have been deceived by the strong conviction I felt of the will being inoperative in its influence over muscular motion. My failure reminded me forcibly at the moment of a phenomenon invariably remarked during the impaired acuteness of the mind which often attends the early stage of hemiplegia. When the patient is told to stretch out the palsied arm, he stretches out the other, however pointedly the physician turns his attention on the powerless limb, and even though the patient

himself keeps his eye on it; thus clearly showing that the will orders, though the muscles cannot obey.

The integrity of the mental faculties, during the prostration of that cerebral function which conduces to the operation of the will or muscular action, was most remarkable. The minute details I have given are chiefly intended to illustrate this point; and I am persuaded that I have not overstrained any one article of evidence on that head.

The apparent efficiency of coffee, in removing what remained of the poisonous action after five hours' duration, is not unworthy of notice. Every physician knows that coffee is used for dispelling the after-effects of various narcotic poisons; but its real utility has been doubted. In the instance of the present poison, the *post hoc* at least was both very prompt and most complete, so far as the main symptom, the irregular heart, was concerned; and I have myself no doubt of the reality of the curative action.

Whether the extraordinary power which this poison possesses in depressing the action of the heart, may be susceptible of application in the exercise of the healing art, is a question which time and experiment will alone enable us to answer. Its mere potency is no objection, when it is considered that drugs so potent in poisonous energy as hydrocyanic acid, aconite, and digitaline, are now firmly established in medical practice as safe and efficacious remedies.

Let me advert lastly to a peculiarity in the action of the ordeal-bean which struck me forcibly while labouring under it. Philosophers have thought it not unworthy of inquiry, how in criminal executions death may be completed without physical suffering to the criminal. Governments have even consulted science on the subject. But science has not yet satisfactorily solved the question. Meanwhile I suspect it has been accidentally solved by the negroes of Old Calabar. At least, so far as the effects of their state-poison on myself went, there was no bodily uneasiness except the single attack of sickness—apparently the relics of the action of my peculiar emetic,—but simply a sense of sinking vitality, with clearness of mind, and without any sensation deserving in the slightest degree to be called physical distress. We know, indeed, that many forms of extreme fainting, of which this is evidently one, are attended with feelings, which, if not positively pleasurable, are certainly quite unallied to pain. Death by simple fainting, without any preparatory painful process, is evidently what a humane execution should aim at producing. And all this, I apprehend, will be effected by the Calabar ordeal-bean.

[We regret to have been compelled somewhat to abridge this valuable paper. We have, however, added a wood-cut of the *Ordeal-bean*, taken from a specimen presented to us by Dr. Christison.—*Ed. Pharm. Journal.*]

SUSQUEHANNA ROOT.

In consequence of inquiries respecting an alleged remedy for indigestion, sold under the name of Susquehanna Root, we have endeavoured to ascertain the nature and source of the plant. It is advertised as "Professor Webster's remedy," &c., and sold by the Botanic Society of Hounds Gate, Nottingham. A correspondent at Nottingham informs us that the said Society "consists of one member," who is said to be "driving a roaring trade in Professor Webster's Pills." He continues, "I understand he receives as many as fifty or sixty letters a day about them."

The following is a copy of the circular which is issued by the "Society," which we publish as a curiosity, and also to explain the system pursued by this individual.

"PROFESSOR WEBSTER'S REMEDY FOR INDIGESTION, BILIOUS, AND LIVER COMPLAINTS.

Pulv. Susquehanna Root	3 Drachms
Quinine	1 Drachm
Extract of Sarsaparilla	1 Drachm

Make the mass into four-grain pills. Take two pills every other night.

"The Nottingham Medical Reform Society can promise the most signal benefit to sufferers from indigestion, who will give the above remedy a fair trial; it has cured a great number in Nottingham and the immediate neighbourhood, who were languishing under the withering effects of indigestion in every form, and in bilious and liver affections it is of great benefit, it gives tone and

strength to the stomach, dispels wind, and purifies the blood; its occasional use will cause the bowels to act regularly. They operate very mildly.

"Persons requiring this remedy are strongly recommended to purchase the ingredients and prepare it at home, and in no case to entrust to a Druggist the duty of compounding it, the interests of Druggists being so closely identified with the allopathic system of Latin prescriptions and mysterious designations of the simplest articles, is naturally opposed to the present Medical Reform Movement, which has for one of its objects the calling of things by their right (English) names.

"The Susquehanna root, the medical properties of which were discovered by Professor Webster, having recently been introduced into England, is not kept by any Druggist; it is called by Mr. Webster the Susquehanna root, as it was in Susquehanna county, in the state of Pennsylvania, that he first found it and tested its rare medical qualities; not being at present obtainable in the United Kingdom, the Society have procured a quantity direct from America for gratuitous distribution, three drachms of which is now enclosed.

"To persons in poor circumstances, who cannot afford to purchase the quinine and sarsaparilla, a box of the pills will be forwarded free, by return of post, on application to the Secretary. It is hoped, however, as the Society have already incurred considerable expense, that none will avail themselves of this offer who are really able to pay for the quinine and sarsaparilla, which may be had genuine from any respectable Dispensing Chemist; the cost of the quinine and sarsaparilla should not be more than 2*s.* 4*d.*

"In conclusion, it is hoped that persons whose general health may be greatly improved, and who thereby receive a permanent benefit, will communicate the same, with particulars of the case, to the Secretary, which is all that is required in return for this invaluable recipe, and which will enable the Society to give an impetus to the present movement in favour of Medical Reform. In any future communication direct as before,—The Secretary, Botanic Institute, 6, Hounds Gate, Nottingham.

"The Committee regret to state that in consequence of the immense number of applications, the Society's stock of Susquehanna root is exhausted; a fresh supply is on its way from America, and is expected in two or three weeks. On its arrival, applicants will be supplied as usual, gratis. The Society have still upwards of 600 boxes of pills; parties therefore, who are anxious to have the remedy immediately, should write to the Secretary by return, or within three or four days, and they will receive a box of the pills by return of post, for which, those who can afford it, might enclose a few stamps, but those who cannot, should not on that account be deterred from applying, as no application will be refused. The plain address, but no envelope, should be sent. (By order of the Committee) S. Rushworth, Secretary."

Botanic Institute, Hounds Gate, Nottingham,
Feb. 24, 1855.

THE SALE OF ADULTERATED CHEMICALS.

[The following case shows the liability which attaches to the sale of adulterated chemicals *for manufacturing purposes*, and it suggests the question what damages would have been incurred if the articles had been required for medicinal use, and injury to health or life had been sustained?—Ed.]

OXFORD CIRCUIT.

Stafford, March 17,

Before Lord Campbell and a Special Jury.

FLOYD *v.* FOSTER.

Mr. Keating, Q.C., and Mr. Scotland appeared for the plaintiff; and Mr. Serjeant Thomas, Mr. Gray, and Mr. M'Mahon for the defendant.

The plaintiff in this action, James Floyd, was a porcelain manufacturer at Fenton, in this county; and the defendant, John Foster, was a merchant, carrying on business at Hull, in Yorkshire. The action was brought to recover damages for the breach of a warranty of a quantity of borax and tincal, which the defendant had sold to the plaintiff for the purpose of being used in the manufacture of "fret," or glaze, for porcelain and earthenware. It appeared that borax was a crystal found in certain lakes in Tuscany, belonging to a Tuscan Count, Landerell, and imported into this country by a Mr. Wood, of Liverpool, who enjoyed a monopoly of the article. The borax was mixed with other substances, and formed a "fret," or glaze, into which the finest kinds of porcelain were dipped preparatory to their being baked in the ovens. An inferior kind of "fret" was made of tincal, and this was used to give a glaze to common earthenware. According to the evidence given by the plaintiff, confirmed by his son, the defendant's traveller had sold him a cask of borax, and two casks of tincal, warranting the borax as Wood's borax, and the tincal as the best that could be bought in the market. The plaintiff used the defendant's

borax for three successive months, and after each firing discovered that his china was damaged by being covered with blisters. At first he attributed these defects to the unskilfulness of his firemen, and discharged several, but he at length submitted a portion of the borax which remained to several Chemists for examination. It was discovered that, instead of being pure borax, it contained about 25 per cent. of phosphate of soda, mechanically mixed with it, and to this adulteration the witness attributed the blisters on the plaintiff's china, which he alleged he had been obliged to sell at a reduced price, at a loss altogether of about £450.

The defence was that no warranty was given, and the defendant's traveller, who sold the goods, was called in support of this defence. He also stated that the borax supplied was pure borax, which the defendant had obtained from Wood, the importer, and in this he was supported by two of the defendant's men. Several manufacturers were examined to show that blisters in china might arise from many other causes besides adulterated borax, and it was argued that the plaintiff's unskilfulness in mixing the fret was the more likely cause. The defendant's traveller stated, that he was not in the habit of offering borax for sale, but that he had supplied the cask in question to the plaintiff, at the cost price, in order to oblige him as a customer; and he added, that the defendant did not deal in phosphate of soda, the substance with which, according to the plaintiff's evidence, the borax which the defendant had sold him had been adulterated. The plaintiff, however, produced a card of the defendant's, hundreds of which the witness admitted he had circulated, in which the defendant was described as a "manufacturer of borax," and as dealing, among other articles, in "phosphate of soda."

Lord Campbell, in summing up the evidence, said the first question for the jury would be, whether there was a warranty; and, secondly, whether there had been any breach of it; and, if so, what amount of damages the plaintiff was entitled to recover.

The jury found a verdict for the plaintiff,—Damages, £400.

FOSTER *v.* FLOYD.

This was a cross action between the same parties, brought by the defendant in the former action to recover the price of the goods sold.

Lord Campbell expressed a strong opinion that, as the plaintiff had obtained damages for the breach of the warranty, he had no defence to this action.

The defendant eventually submitted to a verdict of £40, beyond the sum of £16 paid into court.

The same counsel appeared as before.

The court sat till past ten o'clock.

TESTIMONIAL TO PROFESSOR BENTLEY.

The late Professor Forbes was appointed to the chair of Botany in Edinburgh in May, 1854. He had at the time of this appointment delivered the first six lectures of the course at King's College, and Mr. Bentley completed the course, which comprises about fifty lectures. It was understood that this was a provisional arrangement, and that the election of Mr. Forbes's successor would take place early in 1855. Six candidates came forward, of whom two were selected by the Council to go on the ballot, namely, Mr. Bentley and Mr. Henfrey. After a suitable period of canvassing and suspense the election took place, and resulted in favour of Mr. Henfrey.

Although the Botanical Students at King's College had no voice or influence in the election, they were not insensible to the merits of the Professor who on short notice had occupied the position suddenly vacated by Mr. Forbes, and had delivered nearly an entire course of lectures. They therefore expressed their sentiments, on the occasion of the displacement of Mr. Bentley, in an address in the following terms, engrossed on vellum and inclosed in a portfolio, which was presented to him by a deputation on behalf of the class:—

"Dear Sir,—We desire to return you our warmest thanks for the interesting and instructive course of lectures you delivered to us last summer's session, 1854, and for the invariable kindness and courtesy we received at your hands, of which we shall ever retain a grateful recollection.

"At the same time we cannot help expressing our regret that we shall not again experience the advantage of your able instruction.

"We feel that we have lost a Professor who, by his scientific attainments, and by the esteem and respect in which he was held by his pupils during the short time he was connected as Lecturer with the College, would have proved an honour to it, and would have greatly assisted in maintaining the present high position of our medical school."

BOOKS RECEIVED.

A Manual of Elementary Chemistry; *being a Practical Class-Book.* By R. M. Glover, M.D., F.R.S.E.

We had thought that a sufficient number of manuals of Chemistry, of various sizes and degrees of merit, already existed, to meet the requirements of the different classes of chemical students, and were anxious to discover the special object of adding another; which was, it appears, to give "a comprehensive view of the more essential facts of Chemistry within a very moderate compass." We think the author undertook a difficult task, and are not surprised to find that his success has not been signal. To do well that which he proposed, would involve the exercise of much judgment and talent, and the possession of an enlarged knowledge of the subject. As the extent of such a work is diminished, the importance of making a judicious selection of matter increases, and a clear and forcible style becomes more necessary.

The following quotation will illustrate the style of the author:—"Carbon is a principal constituent of organic bodies; but not the principal constituent of animals, the greater portion of whom is composed of water. But nearly all organic bodies contain a large quantity of carbon, and as this is united with more volatile and combustible compounds, or rather in compounds which, on being heated, are partly resolved into compounds very volatile and inflammable, of carbon, oxygen, and hydrogen, leaving a portion of carbon at a moderate temperature, the process of *charring* is a test of organic matter."

The following will indicate the extent to which reliance may be placed on the accuracy of the matter. Under the head of Sulphuric Acid it is stated:—"This most important acid is prepared in commerce in two ways, either by the distillation of copperas, or sulphate of iron. First, water is driven off, then there is some decomposition of the salt, since sulphurous acid and peroxide of iron are formed; but one equivalent at least of sulphuric acid is driven off pure. $2FeO, SO_3 = SO_2 + Fe_2O_3 + SO_3$. This acid is made at Nordhausen, in Germany, and is always called the Nordhausen acid; it has a sp. gr. of 1.9, and contains 2 of real acid to 1 of water. Its formula is $2HO, SO_3$." We pity the student who has to study such matter, and the blunders which pervade this quotation are a fair sample of what occurs not unfrequently elsewhere. Thus, ceruse or white lead is represented as PbO, CO_2, ethyl as $C_4 H_5 O$, and ether as $C_4 H_5$.

The Yearly Journal of Trade for 1854-5. By Charles Pope, formerly Principal Secretary to the then Chairman of the Board of Customs.

This book is full of valuable information on commercial affairs. It contains the laws of customs, excise, and stamps; the tariffs of this and other countries; countervailing and inland duties; post-office laws and rates; treaties and conventions with foreign powers; exchanges, moneys, weights, and measures; geographical sketches, and recent discoveries; descriptions of articles of merchandize; statistics, &c. To the merchant it is a most useful book of reference, and to all those engaged in trade it cannot fail to be instructive and even interesting. The dry statistical matter with which it abounds is interspersed with bits of historical or other information, either derived from correspondents abroad, or taken from journals or other publications at home.

Report on the Cholera Patients admitted into Middlesex Hospital during the Year 1854. By B. S. W. Sibley, Registrar. London. J. Truscott, Nelson Square. 8vo, pp. 28. With Appendix.

This is an interesting Report. In addition to the report of the general treatment and its result, the cases are reduced to a tabular form in the Appendix, shewing at one glance the statistics relating to the history of each case—viz., occupation,

previous health, food, drink, cleanliness, infection, symptoms, treatment, result, number of hours, collapse, consecutive fever, &c., &c. Much credit is due to Mr. Sibley for the labour and care which he has bestowed on the preparation of this report, the circulation of which is calculated not only to benefit the Hospital from which it emanates, but also to convey valuable information to the profession. If similar returns could be obtained from all the hospitals in which Cholera has been treated, a comparison of the symptoms, treatment, and results, would be of great service on future emergencies.

TO CORRESPONDENTS.

Mr. F. P. Balkwill (Plymouth).—We regret the insertion of the remark of Mr. Burrell referred to (in our last number, page 414), as it appears to be liable to misconception. We do not, however, interpret it as having reference to any doctrine of the Christian religion, but to a conception of recent origin at Rome.

"*An Anglo-Saxon*" coincides in opinion with "*A Kentish Chemist*" (of last month), and also objects to the tone assumed in some of our editorial articles, which he says occasionally "aim an offensive blow by the indulgence in a species of sarcasm upon those who from various causes are compelled to mix with their business certain articles which it would appear are incompatible with that of a Pharmaceutical Chemist." Although the "Anglo-Saxon" has not trusted us with his name, we cannot refrain from correcting his mistake. We have *never* intentionally thrown out any sarcasm against a qualified Pharmaceutical Chemist who in a country-town adds a variety of etceteras to his stock of drugs, in compliance with the custom of his neighbourhood; but we wish to draw a line between such persons and the uneducated huckster, or chandler, who sells a little of everything, drugs included, but is not a Chemist, and would not have been eligible as a Member of the Society, even before the examinations commenced. If it were possible to isolate Pharmacy from every other branch of trade, it might be desirable; but *necessitas non habet legem*. See page 389 of our last number.

W. I. D. (Portsea).—(1.) Yes.—(2.) Yes. See vol. iv., pages 480, 493, and 577; vol. vi., pages 99, 101, and 145.—(3.) Cayenne may be sold without a licence; it is not a pepper but a capsicum.

B. G. H. (Plymouth).—*Unguentum Hydrargyri Nitratis.* See vol. iv., p. 450.

E. W. (Park Terrace).—*Aqua Destillata.*

A Subscriber (Exeter).—*Liquor Senna Dulcis.* Vol. iii., page 115; and vol. ix., page 524.

An Apprentice (Gravesend).—Fownes's *Manual of Chemistry.* Royle's *Materia Medica.*

P. D. (Chelmsford).—Hooper's *Medical Dictionary.*

H. S. P. (Tavistock).—*Robinson on the Teeth.* A Manual is in course of publication by Mr. Churchill, answering to the description.

A Nice Member (Liverpool).—The subject will be considered.

M. P. S. (Jersey).—We have no means of obtaining the formula for "Rowlands' Kalydor."

Avalon wishes to obtain information as to the best method of purifying casks which have become musty, and which are to be used for holding cider. He says the great brewers at Burton-on-Trent have a specific for the cure of stinking casks, but he has not been able to ascertain what it is. [We believe the brewers generally purify their casks by steaming them.]

C. A.—The tests for morphia are not similarly affected by ipecacuanha. In the description given the perchloride of iron was not properly applied.

CORRIGENDUM.

In last month's Journal, page 420, 16th line from the top, *for* deep, *read* deeply.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. XI.—MAY 1st, 1855.

THE PROCEEDINGS IN ERROR.

The day fixed for the hearing of the Appeal, in the case of Dickinson *versus* the Pharmaceutical Society, was Wednesday, the 24th April. It was anticipated that the argument would not occupy much time, and that the vexatious proceedings against the Society would thereupon terminate. We must, however, have patience and wait a little longer.

To persons inexperienced in the science of litigation it may appear extraordinary that so much delay and inconvenience should arise in the settlement of a question which, as explained by Lord Campbell in the recent judgment in the Court of Queen's Bench, presents no points which an appeal to common sense would not immediately clear up. To persons unacquainted with the *animus* of the prosecutor and the history of the case, the object for which the proceedings were commenced, and the purpose for which they are persisted in, must appear no less mysterious and unintelligible. In most cases the party instituting legal proceedings has some interest at stake, or some object (either public or private) which he hopes to attain, by the pecuniary sacrifice and the mental anxiety to which he exposes himself. It is not so in the present instance, as the prosecutor, if he had obtained a victory, would have gained nothing by it, nor would he have rendered a service to the public. His victory would have been a costly one to himself, besides inflicting a serious injury on several hundred persons who have done him no wrong, and on a Society of which he is a Member, and in the prosperity of which he professes to be interested.

If the object of the proceedings had been to strengthen the position of the Society, by clearing up a point of law on which a difference of opinion existed, the recent decision of the four judges would have fully answered the purpose. But, in the present state of affairs, another question presents itself—By whom are the costs to be paid? On this subject the solicitors of the prosecutor have evinced some anxiety, and being *the parties interested in continuing the suit*, we presume that they have advised their client accordingly, in the forlorn hope that some casualty in the argument may possibly improve his position and their prospects.

The postponement of the Appeal until next term is unfortunate, but we hope the Members of the Society will not be discouraged, as we entertain no doubt of a favourable decision sooner or later. The Council have from the commencement up to the present time acted strictly on the defensive, under the best advice they could obtain, and the only course they can pursue, is that of resisting by every means in their power, the endeavours of their opponent and his solicitors to injure, and (if possible) break up a Society established for an important public benefit.

COURT OF EXCHEQUER.

Westminster Hall, 24th of April, 1855.

PRESENT.—Lord Chief Justice Jervis; the Lord Chief Baron; Mr. Baron Parke; Mr. Justice Cresswell; Mr. Justice Williams; Mr. Baron Martin: and Mr. Justice Crowder.

THE QUEEN *v.* THE REGISTRAR OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

Sir Fitzroy Kelly.—With regard to the case of the Queen *v.* the Pharmaceutical Society, which is in your Lordships' paper, I have to pray your Lordships to allow this to stand over until next sitting. My friend Mr. Bramwell on the other side, has

been kind enough to consent. I find it has been put into this list of errors, and I am unfortunately after to-day, for the next two days obliged to be elsewhere.

Lord Chief Justice Jervis.—The Court does not sit to-morrow; it sits on Thursday.

Sir F. Kelly.—On Wednesday and Thursday I am obliged to be elsewhere; if your Lordships would allow it to stand over until either the next sitting or to some other time, when it might be taken.

Mr. Baron Parke.—What is the reason that it cannot be heard on Thursday?

Sir F. Kelly.—It is entirely a personal reason, my Lord; I am most unfortunately obliged to be under a very long-standing engagement in the Court of Chancery, both on Wednesday and Thursday. It is entirely with my friend's very good-natured acquiescence, if your Lordships would only indulge me, that I may not have to attend here on Thursday.

Lord Chief Justice Jervis.—Then it must stand over until next term.

Mr. Bramwell.—If it could be heard any time before next term we should be glad, as it is a matter of some importance to this Society, with reference to their May meeting.

Lord Chief Justice Jervis.—Why do you call it the Pharmas*u*tical Society?

Sir F. Kelly.—There was a discussion upon that point in the Court of Queen's Bench, as to the question of Philology. Their Lordships were unanimously of opinion that it was to be called Pharmas*u*tical.

Lord Chief Justice Jervis.—I thought it was always known as *keu.*

Sir F. Kelly.—There was a great difference of opinion at the bar; but the Bench as usual prevailed, and it is pharmas*u*tical now under authority.

Lord Chief Justice Jervis.—Then it is decided in the Court of Queen's Bench that it is *ceu.*

Mr. Baron Parke.—It is called *Cicero*, but in the Greek it is *Kikero.*

Sir F. Kelly.—That is not one of the points in error on which we ask your Lordship's judgment.

Mr. Bramwell.—I do not know that it could be argued before next term.

Lord Chief Justice Jervis.—It could be argued, but it could not be heard by the Judges, because we shall not sit.

Mr. Bramwell.—Then we should have a quiet argument, at all events, my Lord, but I do not know whether there is not a difficulty in the way of your Lordships hearing it at all. The proceedings taken to bring this *mandamus* here are under the Common Law Procedure Act, not the old writ of error that would be applicable before the Common Law Procedure Act. * * * * *

On this point arose an argument of an abstruse and technical nature, in which all the lawyers, were almost out of their depth, when some good-natured individual placed in the hands of Mr. Bramwell a copy of a recent Act of Parliament, namely, *the last Common Law Procedure Act*, the 77th section of which threw some light on the question. This occasioned considerable mirth among the lawyers, and after some apologies, repartees, and explanations, it was finally decided that the case should be adjourned until next term.

THE MATERIA MEDICA OF THE PHARMACOPŒIA.

Some of our Correspondents have requested further information respecting the list of drugs and preparations and the purpose for which the same has been prepared by the Pharmacopœia Committee, and circulated among the Members. The object is partially explained by the questions at the commencement of the pamphlet, and we endeavoured when previously alluding to the subject, to point out the mode by which the most valuable assistance might be afforded to the Committee. It should be understood that the list is not issued as a complete and correct one, but as a digest of the contents of the Pharmacopœias of the three Colleges, as at present published, showing the discrepancies in terms and nomenclature and also in the selection of the materials comprised in the Materia Medica. It is the object of the Committee to correct clerical or other errors, to supply deficiencies, to erase redundancies, and thus to produce a correct catalogue, comprising the contents of the three Pharmacopœias, arranged in a convenient form for final revision by the College of Physicians.

It is not expected that remarks shall be made on every article on the list. There are many substances which are so universally known and employed, that they need no comment. Others are rarely used. Some have become almost, if not quite, obsolete; and there may be medicines in common use in some localities which are not included in the list. It is on such points that information is desired, to assist the Committee in completing the list; and although it was requested that suggestions might be furnished as early as might be convenient, the Committee will be glad to receive them at any time during the progress of their deliberations. The subsequent portions of the Pharmacopœia may probably be more interesting to the Members generally, but no portion of it is more important than the list of Materia Medica, which is the foundation of the work, comprising as it does the materials of which the several preparations are composed.

HOMŒOPATHY IN THE ARMY AND NAVY.

A PROPOSAL to establish a homœopathic hospital at Smyrna, or elsewhere, for the benefit of our soldiers and sailors, has been seriously and earnestly submitted to Lord Panmure. The leading supporters of this project are the Earl of Essex; Lord Lovaine, M.P.; Gen. Sir John Doveton, K.C.B.; Admiral Gambier; Colonel Wyndham; Colonel Taylor, R.A.; Captain Fishbourne, R.N.; and Lord Robert Grosvenor, who attended as a deputation, and presented a memorial signed by the Archbishop of Dublin, the Dukes of Beaufort and Wellington, the Marquis of Abercorn, and 18 other Members of the House of Lords, 43 peers' sons, baronets, and members of Parliament, 17 generals, 33 field-officers, and 43 other officers of the army, two admirals, 15 captains of the navy, 65 clergymen, 45 justices of the peace, barristers, and solicitors, and 314 bankers, merchants, and others.

When we reflect upon the hardships and privations which our sailors and soldiers have endured in the East, we cannot but rejoice at the prospect thus held out of an "improved system of diet and regimen," which constitutes the most important feature in homœopathic practice, and without which even the globules (however marvellous may be their effects when accompanied with an appropriate diet) would be unavailing. We may hope that wholesome and nutritious cocoa, manufactured according to homœopathic instructions, may be substituted for raw coffee, and that raw beef may be replaced by rations properly cooked. Due attention also must be paid to cleanliness, air, and exercise, for unless these precautions be observed, discredit will inevitably fall upon the homœopathic theory.

Thus far we cordially approve of the proposal to confer the benefit of the system upon the soldiers and sailors whose wants and comforts have hitherto been either sparingly supplied, or left at the mercy of the person who is generally held to be responsible when anything goes wrong—that is, "NOBODY." The distinguished personages whose zeal in the cause of homœopathy has led them to support the proposition with their influence, must exert that influence in enforcing a strict adherence to the dietary part of their system, this being a necessary element.

If, however, the proposed Institution is to comprehend in its functions the medical and surgical treatment of all cases which may come within its precincts, the question assumes a grave aspect, and requires a second thought.

According to the fundamental doctrine of Hahnemann, "*Similia similibus curantur*," the appropriate remedy for the cure of a disease is that which would produce a similar disease or similar symptoms if applied to a person in a state of health. Thus, ipecacuanha is given to allay sickness, jalap or colocynth to relieve diarrhœa, &c.

This principle was recently exemplified at Darlington, where Dr. Galloway,

a homœopath, was called to attend a child who had measles. He administered some powders and pills, contents unknown (we are not informed what medicine will produce measles in the healthy subject). The result, however, was intense salivation. The teeth of the child came out, ulceration or gangrene of the lip and lower jaw supervened and extended to the nose, half of which was gone by the time the child died. The doctor on observing the salivation, as stated by himself at the inquest, "knowing that similar symptoms have been produced by large doses of mercury, and also that according to the well-known homœopathic law '*Similia similibus curantur*,' exhibited a homœopathic preparation called *mercurius solubilis*, about a billionth of a grain at a dose, twice or thrice a-day." He proceeds, "I don't know how many doses the child took, but in a day or two afterwards I found the disease progressing rapidly. I then wished to change the medicine, and accordingly gave some powders containing three globules of phosphorus and silica, a dose of each alternately every day." In administering phosphorus the doctor acted consistently according to his principles, as that substance produces on the healthy subject the peculiar ulceration and destruction of the jaw which is called "phosphorus disease." In spite of the remedy the disease continued to progress, and the symptoms became so alarming that four medical practitioners were called in, but by that time the case was hopeless.

If Dr. Galloway were called to attend a patient in the Crimea suffering from a gun-shot wound, produced by lead, he would, on the principle above elucidated, reason thus:—"*Similia similibus curantur*." "I must exhibit a homœopathic preparation called 'plumbum,' about a billionth of a grain at a dose, twice or thrice a-day." If the wound were occasioned by a sword, or by a fragment of a shell, Quevenne's "Pulvis ferri," triturated *secundum artem* with sugar of milk, might be the appropriate remedy. Supposing scurvy to be occasioned by an excess of salt beef, the remedy, on the theory "*similia similibus*," would be salt pork in doses of a billionth of a grain, triturated with sugar of milk. It is needless to speculate as to the probable efficacy of the sugar of milk treatment in cases of ague, dysentery, cholera, or hospital fever, or in the acute disorders to which persons of full habit are sometimes liable.

It is, however, well known that the practice of homœopaths does not always accord with their theory, so far as relates to the doses administered. On an examination of Dr. Galloway's globules, some of them were found to contain an appreciable quantity of bichloride of mercury, which would not have been the case if they contained only a billionth of a grain. In others, not a trace could be observed, showing how accurately (?) they were mixed! There is no evidence as to the contents of the powders first given. We have on former occasions noticed the fact that full doses of morphia and other powerful medicines have been detected in globules administered as homœopathic. The cautious and skilful professor knows better than to allow his patient to have in his possession (except on his tongue) any such evidence of deviation from the infinitesimal theory. But it has been established in numerous cases that the theory is not rigidly adhered to by its professors, although they usually avoid entering into any explanation on this point. The mystery belonging to the "homœopathic doses" constitutes the chief charm of the system, which is on this account especially adapted to the imaginary ills and prejudices of a nervous or over-fed aristocracy, but no argument is needed to show the absurdity of sending a cargo of sugar-plums for the relief of the sufferings endured by our soldiers and sailors during a campaign in a remote and unhealthy climate where epidemics prevail, and the casualties to which the men are exposed demand prompt and active treatment.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

MEMBERS.

Bushey	Doughty, Richard
Cambridge	Youngman, Robert
Cheltenham	Hands, William
Chelsea	Quiller, Charles Rowett
Colchester	Chaplin, John Lambert
Coventry	Astley, John
Edinburgh	Steele, David
Liverpool	Welch, Thomas
London	Carr, John
	Haselden, Adolphus F.
Salford	Robinson, Benjamin
Stourport	Dance, William Dickens
Walmer	Peake, James

MAJOR EXAMINATIONS.

Cracknell, Benjamin	Halesworth	Watson, Walker	Nuneaton
Radermacher, Chas. John	Glastonbury	Williams, John Thompson	Carmarthen

MINOR EXAMINATIONS.

Arnold, William U.	Thirsk	Lingwood, James Grace	Yarmouth
Baissac, Peter Joseph	Mauritius	Moss, William Amphlett	Worcester
Baxter, George	Chester	Noël, Ferdinand	Mauritius
Beach, James	Bridport	Routledge, Henry	London
Fouracre, Robert	Salisbury	Nooten, Ernest Van	Edinburgh
Griffith, Alfred William	London	Scott, Henry Thomas	Blandford
Jessop, John	Clapham	Symes, Henry Tanner	London
Jolley, Horace	London	Taplin, Frederick	Bristol
Jones, Thomas	Chester	Taplin, George	Bath
Kemp, David Skinner	Edinburgh	Thornton, John Barber	London

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Beaton, Walter	Mr. Beaton	London
Berger, Volcy	Mr. Deane	Clapham
Brown, John	Mr. Waller	London
Brown, William Henry	Mr. Corder	North Shields
Foster, Thomas Upall	Mr. Weston	Sleaford
Holmwood, William Charles	Mr. Coppock	Bridport
Scarlin, James Henry	Mr. Marchant	Ipswich
Walton, Ralph	Mr. Ritson	Sunderland
Ward, Shaw	Mr. Lofthouse	Hull

PHARMACEUTICAL MEETING,

Wednesday, April 4th, 1855,

MR. DEANE, PRESIDENT, IN THE CHAIR.

The following Donations to the Library and Museum were announced:—

The Journal of the Society of Arts, from the Society of Arts.
The Journal of the Photographic Society, from the Photographic Society.
The Literary Gazette, from the Publishers.
The Chemist, from Mr. Highley.
A Pamphlet on the French System of Weights and Measures, from the Author.
A large piece of Jalap, from Messrs. Horner & Co.

[This paper was sent for publication in the Journal of last month, but was reserved for the Meeting.—Ed.]

ON CONCENTRATED INFUSIONS.

BY MR. G. F. SCHACHT.

As the attention of prescribers and pharmaceutists is at the present moment engaged with the subject of "Concentrated Infusions," and, as we are led to understand by a recent circular, the Pharmacopœia Committee are desirous of eliciting individual experience upon all such matters, I venture to offer a few observations on the subject.

Of the twenty-three infusions of the London Pharmacopœia, about a dozen are so frequently prescribed, that in order to prevent perpetual disappointment to their patients and customers, most dispensing establishments find it desirable to keep them ready prepared. These are—

Infusum Anthemidis	Infusum Quassiæ
" Aurantii Co.	" Rhei
" Calumbæ	" Rosæ Co.
" Cascarillæ	" Sennæ Co.
" Caryophyllis	" Valerianæ
" Gentianæ Co.	

However excellent the above object may be, it can only be carried into effect by a considerable and constant sacrifice of time and attention, as the following "memorandum" will serve to show:—

"Memorandum for the Dispenser.—At 7.30 A.M. put on distilled water to boil, throw away yesterday's infusions, and clean out the bottles; weigh the fresh ingredients and add boiling water at (the above fully occupies half an hour)

	8	A.M., then	
At	8.10	"	strain off Infus. Anthem.
At	8.15	"	" " Aurant. Co.
At	8.30	"	" " Valerianæ
At	9	"	" " Sennæ Co.
At	9	"	" " Gentian. Co.
At	10	"	" all that remain."

It is almost needless, and yet very pertinent, to remark that unless the periods of maceration be strictly observed, the preparations cease to be P. L. Infusions; and further, that in a house where there is anything to do, it is scarcely possible the Dispenser can promise himself a disengaged minute at the five particular periods above indicated; on the other hand, not only is temptation constant, but necessity is often imperative, that they be allowed to stand till a convenient moment. But to be really Pharmacopœial, the Dispenser's daily infusion duties must extend over, and occupy a large portion of, $2\frac{1}{2}$ hours.

Now this appears to me an obligation every Pharmaceutist may legitimately desire to get rid of, provided he have the sanction of authority. That authority can only be expected by submitting with any suggested change a reasonable proof that the resulting preparations shall be equally excellent.

I venture to submit the following considerations as reasonable grounds for urging the processes subsequently appended :—

1stly. The difficulties above recorded.

2ndly. That as some of the Pharmacopœia infusions contain nothing that is volatile, no deterioration is likely to occur by careful evaporation.

3rdly. That in others the water is not fully charged, hence more concentrated preparations can be made by simply increasing the proportion of the ingredients, and thus obviating all necessity for evaporation.

4thly. That though others are in all regards inapplicable for concentration, their cases apply no further than to themselves.

Hence I submit, that as the Pharmacopœia authorities have already acknowledged two "Concentrated Infusions," and given processes for their preparation, an extension of the principle and the introduction of equally judicious formulæ in certain other cases would be attended with considerable advantage not only to Pharmaceutists but to Pharmacy.

I find it then necessary to class the above list into three groups :—

Group 1.
- Infusum Anthemidis
- " Caryophylli
- " Valerianæ

I consider these inapplicable for concentration.

Group 2.
- Infusum Calumbæ
- " Cascarillæ
- " Rosæ Compositum
- " Sennæ Compositum

As the ingredients of this group contain little that is volatile, the following processes are recommended :—

Infusum Calumbæ Concentratum.—℥j.=℥ss.

℞ Rad. Calumb., 10 oz.
Sp. Vini. Rect., 5 oz.

Exhaust by displacement with cold water, and evaporate at 150° to 35 oz. Add th spirit, and filter through coarse paper.

Infusum Sennæ Compositum Concentratum.—℥j.=℥ss.

℞ Fol. Sennæ, 30 oz.
Rad. Zingib., 2 oz. 5 drs. ℈j.
Spirit, 5 oz.

Infuse the ginger in 10 oz. of boiling water ; exhaust the senna with cold water, and evaporate at 150° to 35 oz. Mix the liquors, add the spirit, and filter through coarse paper.

Infusum Cascarillæ Concentratum.—℥j.=℥ss.

℞ Cort. Cascarillæ, 24 oz.
Sp. Vini Rect., ℥v.

Exhaust by displacement with cold water, and reserving the first 25 oz. that pass through, evaporate the residue at 150° to 10 oz. Mix the liquors, add the spirit, and filter through coarse paper.

Infusum Rosæ Compositum Concentratum.—℥j.=℥ss.

℞ Fol. Rosæ, 6 oz.
Sacch. Alb., 12 oz.
Acid Sulph., ℥ij. ♏ xiv.

Rub the roses and sugar together to a state of fine division. Exhaust with cold water, and evaporate at 150° to 40 oz.; filter through coarse paper, and add the acid

Group 3.
- Infusum Aurantii Compositum.
- " Gentianæ Compositum.
- " Rhei
- " Quassiæ

For these the following methods produce excellent results:—

Infusum Aurantii Compositum Concentratum.—℥j.=℥j.

℞ Cort. Aurant., 8 oz.
Cort. Limonis, 4 oz.
Caryophillorum Cont., 2 oz.
Spirit, 5 oz.

Place the ingredients in a convenient infusion-jar, and just cover them with boiling distilled water; digest for half-an-hour, and drain off the unabsorbed liquid. Repeat this process until 35 oz. are thus obtained. Add the spirit when cold, and strain through tow.

Infusum Quassiæ Concentratum.—℥j.=℥j.

℞ Quassiæ, 10 drs. 2 sc.
Boiling Water, 36 oz.
Spirit, 4 oz.

Digest till cold, strain through tow, and add the spirit.

Infusum Gentianæ Compositum Concentratum.—℥j.=℥j.

℞ Rad. Gentian. Cont., 4 oz.
Cort. Aurant., 4 oz.
Cort. Limonis, 8 oz.
Spirit, 5 oz.

Proceed as directed for Infusum Aurantii Compositum Concentratum.

Infusum Rhei Concentratum.—℥j.=℥j.

℞ Rad. Rhei. Cont., 6 oz.
Boiling water, Oij.
Spirit Vini, 5 oz.

Digest with occasional agitation till cold; strain through tow, and add the spirit. Set aside for a day, and pour off 40 oz. clear.

I have only further to add that, as I believe the above methods, when practised with ordinary care, afford results that so completely represent the medical qualities of their respective ingredients,—depend so little for their integrity upon the capricious exigencies of the pharmaceutist's occupation, and hence are so constant in their physical characters,—that I sincerely hope, if ever this class of preparations appears in the Pharmacopœia, their employment in all cases (as in the example of the second process for making the distilled waters) will receive the sanction of authority.

Mr. G. Coleby wished to confirm a remark made at a previous meeting, with reference to infusion of Calumbæ. He had always found that this infusion, when made with cold water, underwent decomposition sooner than when made with hot water. He might also state that, according to his experience, the concentrated infusions as at present made did not, when diluted, fully represent the infusions of the Pharmacopœia. He had never seen a concentrated infusion of senna which possessed the same purgative properties as the fresh infusion. If a concentrated preparation of senna was required, he thought that proposed some time ago in the Pharmaceutical Journal by Mr. Southall was worthy of consideration. It was preserved by the addition of treacle instead of spirit.

Mr. Hooper thought it should not be forgotten, in reference to infusion of Calumba, that the Edinburgh and the Dublin Colleges directed it to be made with cold water.

Dr. Edwards thought, after the lengthened discussions which had taken place at several meetings on concentrated infusions, it was time that the matter which had been thus elicited should be arranged and put into an available form, and that the processes which had been proposed should be fairly tested and reported upon.

The Chairman said that would be the duty of the Pharmacopœia Committee, and they would direct their attention to it after they had disposed of the Materia Medica, which was now under their consideration.

ON FILTRATION.

BY MR. JOSEPH INCE.

Whatever is worth doing at all is worth doing well, therefore no apology will be needed as an introduction to a subject that is of the simplest possible nature, but of the deepest practical importance. Now, as appearance has as much to do with physic as with men, it will not be necessary to dwell on the very obvious fact that it is desirable to exhibit all fluid preparations bright and clear, due care being taken not to produce such a result at the expense of remedial power, or to interfere with the actual nature of the medicine itself. A passing allusion may be excused, in reference to the daily experience of every Chemist, that the nauseous qualities of drugs vanish, when art can brighten their solution. Were this the only view the subject offered, it might be left in peace, but another and far more valuable consideration lifts it out of common place, namely, the characteristic tendency of filtration to prevent decomposition.

(1.) Two extracts will serve as an illustration: Extractum Colocynthidis, omitted in the present Pharmacopœia but still in use, and Extractum Papaveris. The dried colocynth pulp in the one case, and the poppy capsules in the other, are directed to be boiled in a certain quantity of distilled water. The decoction is to be strained while hot, and afterwards evaporated to the proper consistence of an extract. When thus manipulated they have three trifling faults: they are not bright, they are not soluble, and they will not keep. The colocynth suffers a strange alteration; it becomes quite hard, and although from the absence of moisture no further change would be expected, it soon gets mouldy, and is then unfit for use. The Extractum Papaveris becomes converted into a granular mass, and looks as if fermenting. Those who are in the habit of making, and not buying, extracts, will have observed this often. Powdered gum arabic has been recommended as an antidote, but the most successful remedy is filtration. This, however, can only be effected by a little artifice; if it be attempted with the strained hot liquor it will be found impossible. This must be first reduced to a syrupy consistence, then diluted with about eight times the quantity of distilled water, after which it will filter readily;—the filtrate is to be evaporated with the usual precautions to a solid extract. Proceeding in this way, three great desiderata are obtained: 1st, Such extracts *look* well and are therefore saleable; 2ndly, They are quite soluble; and, 3rdly, They are practically beyond the reach of decomposition.

(2.) The London Pharmacopœia, that book so well abused, gives several forms for making ointments: one is the Unguentum Florum Sambuci. Elder flowers and lard are ordered to be gently simmered till the flowers become quite crisp, the mass is to be pressed through a linen cloth, and there the process finishes. Following these directions, the result obtained is a somewhat brownish looking preparation, with an occasional specimen of the Sambucus Nigra which will creep through; it is the reverse of bright, and is exactly fitted for the grazing districts; it has two other faults, in the first place it becomes quite hard, and in the second, rancid. Filtration removes the fear of such a catastrophe. Let the elder flowers be treated in the usual way, simmered till brown; press the still heated mass through a strong linen cloth, put it by for a few days, and when it has perfectly set and deposited, then filter it through a steam funnel.

The change effected can only be appreciated by those who have tried it. The ointment is bright, remains permanently soft, and will keep good for at least two years, retaining its characteristic smell and consistence. Various methods have been proposed to effect the preservation of ointments and pomades. The French plan is to wash them frequently, while very lately the addition of nitric ether has been recommended. In Pharmacy little reliance can be placed on any abstruse or elaborate expedients in simple cases; no better means can be adopted to preserve pomades than just to filter them,

and none that are intended to attain a reputation should be allowed to escape this homely process.

(3.) Such is the daily mutual intercourse between France and England, that it is not to be wondered at if some of our remedies have travelled over to the Continent, while many a component of a French Ordonnance has become naturalized with us. Not long ago, a lady of very foreign aspect, and with still more foreign accent, honoured with a visit the establishment with which I am connected. She produced a prescription with an unconcealed mistrust that it could be dispensed in England, as it was not only written by an Italian, but at Rome. It proved to be Fowler's Solution of Arsenic directed to be taken in the usual way. With that urbane persuasiveness of manner which wins the heart and sells the physic, I hastened to inform her that the firm always did as they do at Rome, and sent her on her way rejoicing. Strange as it may appear to meet domestic remedies of our own in the Imperial City, a Frenchman is not less agreeably surprised to find upon our hospitable shores his Fleurs de Violette, or Cigarettes de Raspail. Several syrups have been transplanted from the Codex, such as those of Opium, Ipecacuanha, and Belladonna, which are now in constant use. These three are made by dissolving their respective extracts in water, afterwards adding the solution to a requisite quantity of Simple Syrup. Filtration is here indispensable, as it not only changes their appearance, but has an extraordinary tendency to preserve them. All these minor syrups should be treated in the same way, as the demand for them being necessarily limited they are liable to spoil; but even in the syrups made on an extensive scale, who has not noticed the star-bright appearance of filtered Syrupus Simplex, or of Syrupus Scillæ? and who has not mourned over the forlorn aspect of *un*filtered Syrupus Croci?

Two distilled waters have found their way across the Channel—Aqua Amygdalarum Amarum (*Eau d'Amandes Amères*), and Aqua Lauro-Cerasi (*Eau de Laurier-Cerise*). Of the first, little need be said, as it is not in constant use. Its dose is from ten to 50 drops. But the second is met with in French prescriptions quite as frequently as our Mistura Camphoræ. The English Chemist is sometimes in doubt as to the identical water meant to be employed, and fears to give it in the not uncommon dose of two to four drachms, or more. It is described in the Codex, page 315, article 363. Two pounds of cut fresh laurel leaves, with four pounds of water, are to be distilled over to one half. It is obvious in this process that a portion, and unfortunately a *variable* portion, of essential oil passes over during distillation, and therefore the direction subsequently given, which applies equally to the bitter almond water, must be *particularly attended to*. "Care must be taken to filter the product of the distillation through a moistened filter, in order to separate completely the essential oil, which might remain in suspension." With this precaution the danger vanishes, and the boundaries of our timid rules, that limit the dose of laurel water from ten to twenty minims, may be transgressed with safety. So often is the *Eau de Laurier* prescribed, that the subject becomes of some importance, and it will not be out of place to quote the remarks of M. Cazenove on the same point:—

"The distilled water of the cherry laurel is almost the only preparation of ths vegetable employed. It has been considered by many practitioners as very active, and even dangerous; whilst others, especially M. Fouquier, have increased the dose to several décagrammes in the day (*i. e.*, have given it in half-ounce to one ounce doses: Fouquier gave sometimes twelve ounces in one day). This depends, doubtless, on the manner of its preparation, for if it is not filtered it is an uncertain compound, 'louche,' and contains in suspension a certain quantity of essential oil, which is extremely active. Prepared as the Codex indicates, that is to say, *filtered*, the distilled laurel water is much milder in its effects. The dose is from eight to fifteen grammes (*i. e.*, from about ʒij. to ʒiv.) in a mixture or appropriate julep." This observation settles the question. Precisely

the same direction is given for the *Eau d'Amandes Amères.* When either of the two waters is unfiltered it is unfinished, while in both instances this simple operation has the invariable result of materially favouring their preservation.

The best things will sometimes fall into disgrace by being carried to excess; filtration has its limits, for there are some cases where art is better, and in which time will do more good than alum.

(*a.*) The Tincture of Calumba is directed to be made with thinly sliced Calumba and proof spirit: the Dublin Pharmacopœia orders the root to be roughly powdered; this is to be macerated for the proper period and strained. When so prepared the tincture is muddy,—muddy without any hope of change; filtration does not clear it, for the starchy, powdery nature of the root prevents. If it be made with the whole root as imported, it is always bright, and will not need filtration.

(*b.*) The brightness of a great variety of liquids depends on the mode of their preparation. Whenever an essential oil is present with spirit and water, it is necessary to convert the water into a real spirit by thoroughly well mixing it with a portion of the spirit ordered, nor should this be used until the heat produced by mixing has subsided; a separate tincture should be made with the essential oil, by dissolving that in the remaining spirit, the two when mixed will not be cloudy, and in consequence the finished product will be bright. Paregoric is a well-known instance. When the proof spirit ordered in it is made at the moment by equal portions of spirit and water, the Oleum Anisi added subsequently, the Elixir is a palish-coloured, thickened mixture, which the Opium and Benzoic Acid only complicate. If either the proof spirit ordered be genuine, or the water and oil got rid of by the above-named arrangement, the Elixir is star-bright and of a deep rich colour. The same method may be practised with advantage in ordinary prescriptions—indeed, in all cases where the partial insolubility of an essential oil clouds the product.

(*c.*) Some things will never filter when first made, such as the thick and mucilaginous decoctions. Vain is the effort to brighten the decoctions of Pareira Brava, or Taraxacum, still less the Decoctum Aloes Compositum; equally useless is it to filter the fluid vegetable extracts of Lettuce, Henbane, or Hemlock, yet they are all prescribed, and the public will not have them unless they are bright. Fortunately these vegetable solutions all deposit, especially on the addition of a little Spirit, and when once deposited they filter with the greatest ease. The thick concentrated decoctions, such as Aloes or Pareira Brava should be kept a month—what is the real change effected I am not prepared to say, but they then need no filtering but brighten of themselves, and that with little sensible deposit. There are many tinctures also which it is labour lost to filter until *they have* deposited—such are all those made from the barks, the Tincture of Myrrh, and the tinctures made from simple gums. Neither is it advisable to filter Liquor Ammoniæ Acetatis, when first made, for it not only afterwards deposits, but undergoes a peculiar decomposition which makes it cloudy and generates a blackish, floating, filmy substance. The moment this takes place, filtration should be resorted to, when the Mindererus Spirit becomes quite clear, and is not very liable to suffer further change.

One word of caution should be added as to those cases in which it is wrong to filter. These include all spirits, tinctures, or other preparations of an extremely volatile nature, such as Spiritus Ammoniæ Aromaticus, Liquor Ammoniæ Fortior, and Liquor Volatilis Cornu Cervi, also all pharmaceutical products where cloudiness is a proof of *imperfect* solution, such as the Tincture of Mastich, to filter which is to present something unfinished under a false light, for if the Mastich were really in solution, the tincture would be bright, *per se.* Show is of no use obtained at the expense of strength. When the Solution of Quinine, made by each Chemist after his own individual fancy, is thick and cloudy, the Quinine is not dissolved. To filter it in that state, would make a clear solution, but exclude the active principle. The brightness of a fluid is in some instances

the only proof of its being well prepared, for when the Compound Camphor Liniment is milky, it has been mixed and not distilled; so also when the new remedy, Oleum Morrhuæ c. Quinâ is not transparent, the Quina has not been previously dried or fused. No fluid should be filtered either when *want of brightness* is their proper characteristic. To these the same remark applies as to the colour of the negroes; we have all of us got the notion that they would look much more handsome if white, but it is not their nature. The Decoctum Cinchonæ Cordifoliæ is muddy, and it should be so; to filter is to spoil it. The fresh vegetable infusions, with few exceptions, are never clear nor ought to be. Therefore we look with extreme suspicion on those elegant inventions called Concentrated Infusions, that smell of Spirit and look so like Sherry. To judge of them by appearances, a strong misgiving rises in the mind that something is kept out of the concentrated, which is present in the fresh infusion; now whether this be starch, or the aroma, the active principle or inert matter, we leave others to determine, but the unambitious quiet of Southampton Street prefers the mixture, and adheres to old-fashioned things made in the old-fashioned way.

Nor can a similar waste of ingenuity at all improve the orthodox formulæ for distilled waters. Many of them, when really what their name imports—distillates—are not bright, Aqua Rosæ and Aqua Pulegii being exceptions. Cinnamon water when first drawn over is quite milky, and though by keeping it loses a little this original character, it is never clear. With Pimenta water this is still more the case, and unfortunately it soon spoils. Clove water retains this milkiness to the very last.

If the above-mentioned waters are presented bright, one of two things has happened: either they have been filtered under an erroneous view of their distinctive qualities, or they have been made with Magnesia and an essential oil; in which latter case they have a pervading tepid taste, besides leaving on the palate an acrid unpleasantness, in which not one trace of the carminative remains, to connect the water with its label.

The above remarks are strictly limited to daily Pharmacy. The bearings of filtration on abstract Chemistry are too numerous and too important to be lightly sketched.

The Chairman thought the subject of filtration a very important one in a practical point of view. He believed the preservation of many preparations depended in a great measure on the careful separation of solid matter.

REMARKS ON THE PREPARATIONS OF THE PHARMACOPŒIA.

BY MR. GEORGE WHIPPLE, F.C.S.

(*Continued.*)

Mr. Whipple gave the conclusion of his remarks on the preparations of the Pharmacopœia, the first part of which had been given on the 3rd of January last, and published in the present volume of the *Pharmaceutical Journal*, at page 342.

Infusa.—In reference to Compound Infusion of Gentian, the author suggested that, if made with cold water, the wax, fat, and resin of the gentian would probably be excluded.

In remarking on Infusion of Rhubarb, the author alluded to the numerous investigations which have been made by Chemists and Pharmaceutists, with the view of ascertaining what the active principle of rhubarb is. The medicinal properties of rhubarb have been ascribed, he said, at one time to a bitter principle; at another time to an organic base; then, to an acid; again, to a gum; by others, to a resin; by others again, to a colouring matter; and lastly, not to any one, but to a mixture of these. He thought there was still room for further investigation on the subject.

He made the following general remarks on the Infusions: I believe they are invaluable remedies when prepared according to the Pharmacopœia, whilst my conviction of the so-called Concentrated Infusions, is, that they are inadmissible in dispensing prescriptions, as they are not sanctioned by the College of Physicians. The following is quoted from Dr. Collier's *Supplement* to his Translation of the Pharmacopœia, second edition, fol. 56 :—

"The disadvantages and objections made to these preparations (Infusions) are chiefly based upon the laziness or false economy of dispensers. Infusions cannot be procured at a minute's notice, they will not keep, or ought not to be kept beyond the day. Every dispenser ought to have his set of infusion-pots, and it ought to be a rule that they be emptied and cleaned out every morning. Let the dispenser have no sundry misgivings of the loss of the treasure thus daily ejected ; for the few pence loss he will be amply repaid by the character of his infusions. With regard to the delay in compounding a prescription, there are few cases in which four hours would make much difference. I wish it were in my power to recommend the Concentrated Infusions; but the system is bad, it leads to deterioration—it is an apology for deterioration—it is a premium for idleness. That they have been some years before the public, and have been extensively used by medical practitioners, is, in my opinion, so much the worse for the public, and so much the worse for patients."

To this statement by Dr. Collier I most heartily assent.

Again, the following quotation is from a pamphlet published by a Member of the Pharmaceutical Society, entitled, *The Pharmacopœia a Dead Letter*, by William Bastick, 1845, fol. 11 :—

"The practice of using Concentrated Infusions is very prevalent among Pharmaceutists,—a practice that cannot be too strongly reprobated, as leading to uncertainty in strength and quality, and the administration of no inconsiderable amount of alcohol. In short, the properties of many infusions are destroyed when prepared with the concentrated essence, from the precipitation of many of the proximate principles by the alcohol, and by the long coction which they are subjected to."

I would say, in reference to this subject, that in Pharmacy we should have no proxies—we should hold no fellowship with the nostrum-mongers; but on the other hand, the practice of every dispenser should harmonise with the inscription on his window, "Prescriptions faithfully prepared."

Mr. Whipple proceeded to make some brief remarks on other preparations of the Pharmacopœia.

Linimentum Œruginis. We are directed to "boil down to a proper consistence." *Query*, what is the proper consistence?

Oxymel and *Oxymel Scillæ.* Required, the density of these preparations.

Liquor Potassæ. This is noticed merely to show that the London Pharmacopœia does not insist on chemical purity, for it is stated that on the addition of nitrate of silver, nothing, or *next to nothing*, is precipitated, which I thus translate, a dash of chloride (of potassium) may be present.

Zinci Oxydum. Dr. Collier says, "eminent Surgeons have stated that it does not agree with the skin, and with ulcers, like the oxide prepared by combustion."

Pilula Aloes cum Myrrha. I would suggest the substitution of Spanish soap, or glycerine, sp. gr. 1.260, for soft soap.

Pilula Saponis Composita. This mass, where made according to the Pharmacopœia, would be more correctly designated "compound paste of soap." None of the masses into which soft soap enters can be kept in stock. I would suggest to the College that Spanish soap should be directed to be kept in powder. If, then, the pill mass be made by the addition of syrup, or glycerine, sp. gr. 1.260, the mass will be unexceptionable, and will keep "*ad sæcula sæculorum.*"

Spiritus Ammoniæ Fœtidus. The quantities of hydrochlorate of ammonia and carbonate of potash are excessive, and require large apparatus. Moreover, I think, the tincture of assafœtida might be advantageously substituted for the gum-resin, the spirit being distilled as directed.

Spiritus. I would recommend that essential oils should not be used in making the "spirits" of the Pharmacopœia, but that they be distilled from the fruits, barks, &c.

Syrupi. The density of syrups ought to be given, and rectified spirit omitted.

Syrupus Tolutanus. This is a solution of benzoic and cinnamic acids, for which the opaque mixture of tincture of tolu and simple syrup cannot be a substitute.

Syrupus Ferri Iodidi. This syrup, according to my experience, cannot be kept long, when exposed to the air, without undergoing decomposition. The immersion of iron wire, even, does not prevent the decomposition; therefore, the syrup ought to be made as required. When prepared according to the Pharmacopœia it is of a "greenish colour," yet a syrup is frequently sold under this name which is perfectly colourless. I have reason to think that animal charcoal is used for decolouring such samples. Now, it has been shown by the experiments of Graham, Chevallier, and others, that animal charcoal is capable of withdrawing metallic salts from their solutions, and I have found some of the samples of colourless syrup of iodide of iron to contain scarcely a trace of iodide of iron.

Syrupus Violæ. I believe the petals of "heart's-ease" are sometimes used instead of those of the *Viola odorata*, in making this syrup. The late Professor Burnett stated that the flower of the heart's-ease contains hydrocyanic acid.

Tinctura. The propriety of introducing into the Pharmacopœia a formula for tincture of arnica will no doubt occupy the attention of the College. I think, however, that the best authorities have expressed themselves in favour of infusion of arnica as a better form than the tincture for the administration of this potent remedy.

Unguenta. I hope to see lard excluded as much as possible from the ointments of the Pharmacopœia. I have, on a former occasion, alluded to the impurities which are frequently met with in the lard of commerce. The College will do well to substitute glycerine for lard, wherever this is possible. Much valuable information on the applications of glycerine will be found in the *Pharm. Journ.*, xii., 397; *Journ. de Pharm. et de Chim.*, 1854; *Comptes Rendus*, 1854; *The Chemist*, vol. ii., 257.

Unguenti Conii et Sambuci. I think it an error to boil until the flowers or leaves become "crisp." The essential oil of the one is dissipated, and inert chlorophylle is dissolved in the other. In constructing formulæ for ointments and cerates, much useful and important information will be found in the articles on perfumery by Mr. Septimus Piesse, published in the *Annals of Pharmacy and Practical Chemistry,* for 1853 and 1854.

The Chairman thought the thanks of the meeting were due to Mr. Whipple for the suggestions, founded upon his practical experience, which he had communicated with reference to the Pharmacopœia. He did not agree with him on all points, and there was one especially to which he wished to refer. Mr. Whipple had quoted a passage from Dr. Collier, with which he had expressed his concurrence, to the effect that the use of concentrated infusions was a mere excuse for laziness. Now, he had calculated that the cost, in a small establishment, for preparing all the infusions fresh every morning, was about £8 a-year, which he considered a large tax on a small business; and it could not be wondered at that means should be sought for obviating this expense.

Mr. Bastick wished to explain, in reference to the pamphlet published several years ago by him, to which allusion had been made, that his object in that publication had been to point out the unjustifiableness of substituting concentrated infusions for those made according to the Pharmacopœia. The question whether concentrated infusions can be prepared to resemble or equal the fresh infusions, and which might be ordered under certain circumstances, was

quite a distinct question, to which he had not referred in his pamphlet. With reference to syrup of iodide of iron, he believed it might be prepared so as to be nearly colourless, without the use of animal charcoal.

Mr. Hooper agreed with Mr. Bastick as to the possibility of preparing syrup of iodide of iron free from colour without the use of animal charcoal.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

A Meeting of the above Society was held in 72, Princes Street, on Thursday evening, 5th April, at a quarter to nine o'clock,

MR. H. C. BAILDON IN THE CHAIR.

The meeting was numerously attended, and included Dr. Macadam, Messrs. Macfarlan, Gardner, Bremner, Shaw, Ainslie, Tait, Robertson, W. Baildon, Young, Mackay, &c. &c.

CONCLUDING OBSERVATIONS ON THE CONCENTRATED WATERY INFUSIONS OF THE EDINBURGH PHARMACOPŒIA.

BY MR. JAMES GARDNER.

About two years ago I read some observations on the Infusions of the Edinburgh Pharmacopœia, with a view to show the necessity of some improvement in their preparation, by means of concentration, in such a manner as would be approved of by the Royal College of Physicians.

As it is now a considerable time since these observations were read, I may be permitted very shortly to notice one or two points in the plan I formerly proposed, which may help to secure the desired end.

In all the infusions where the ingredients are aromatic or volatile the spirit necessary for their ultimate preservation is first employed to exhaust the aromatics, and then recovered by percolation.

The residue of the spirituous maceration and the other ingredients are then exhausted by cold or hot water, as may be ordered, and when concentrated at a temperature of about 160° to the necessary quantity the spirituous fluid is to be added. In a few days the clear fluid may be decanted or filtered; and, if necessary, the residue may be subjected to pressure.

In bringing this class of preparations under the notice of this Society on the former occasion, I expressed a hope that some of the other Members would devote a little attention to the subject, and give us the benefit of their experience, that we might suggest such improvements as would induce the College to authorize a class of concentrated infusions that would keep well and set aside the present troublesome, and in most instances imperfect, methods of preparation.

As yet none of the Edinburgh Members have taken up the matter, and it is to be regretted that neither successful nor unsuccessful experimenters have contributed the result of their labours.

Of late the infusions have occupied considerable attention amongst the London Members, and although nothing very new has been brought to light, it is desirable that the subject should be kept before the Society and the medical profession, and if some of the practical men would state their *modus operandi*, it might induce others also to give us their experience.

If the College of Physicians is correct in ordering boiling water as the best solvent of the substances ordered to be prepared by hot infusion, I do not see what there can be to prevent the practical Pharmaceutist from producing concentrated infusions of a superior description, which would keep well, and *when diluted, would be equal, if not superior, would deposit less sediment, and be fit for use for ten or twelve days in temperate weather.*

I observe in the *Pharmaceutical Journal* for April some discussion on this subject, but do not think there has been any practical suggestions mentioned better than those I stated two years ago. Whatever may be the methods adopted by others in preparing concentrated infusions, I have found the preparations produced by the plan I formerly detailed to the Society to be highly appreciated by several medical men who have used them successfully in their practice.

There are a few specimens of the concentrated infusions on the table which have been made for two years, and also some in the *diluted state*, one to seven of distilled water, more particularly the following:—

"Fld. Ext. Scoparii; fld. ext. Senekæ; fld. ext. Hæmatoxyli; fld. ext. Pareiræ Bravæ; fld ext. Bucku; fld. ext. Uvæ Ursi; fld. ext. Serpentariæ; fld. ext. Matico; fld. ext. Chirettæ; fld. ext. Papav. Alb."

In conclusion I may mention, that if any of the Members wish to investigate the matter more fully, it will afford me much pleasure to give them the benefit of any little practical experience I have acquired.

A considerable discussion took place on the merits of Concentrated as compared with fresh made Infusions, in which Dr. Macadam and Messrs. Macfarlan, Baildon, Mackay, Tait, and Baildon took part.

Mr. John Mackay read a paper on

THE OIDIUM, OR VINE DISEASE.

He introduced his subject by referring to the scarcity and consequent high price of bitartrate of potash and tartaric acid, owing to the failure in the production of the usual quantity of wine in Portugal and elsewhere. He proceeded to describe the first appearance of the disease in 1845, and traced its progress up to the present time. He then referred to the various opinions which had been expressed regarding the production and spread of the oidium among the vines, and gave a full description of the manner in which the disease seemed to be propagated, and the peculiar appearance exhibited by the fruit, leaves, stems, and roots of the plants under its baneful influence.

He submitted to the meeting a coloured drawing, showing the wood in a healthy state, and the appearance presented in the course of one and two years after the vine was first struck. He also showed several specimens of the plant itself in an abnormal condition.

After having referred to the great deficiency in the produce of wine, even from comparatively healthy fruit, since the oidium became so general, and the rapidity with which the grape juice under these circumstances ferments, he proceeded to enumerate the methods proposed to cure this formidable and devastating disease. He also referred to the analogy which was said to exist between the potato disease and the grape blight.

He concluded by referring to the almost certain adulteration of wines in consequence of the high prices to which a failure of the vine had already raised wines, especially port, and stated, that not only would the cream of tartar and tartaric acid in all probability be maintained in price, but the farmers themselves be ruined, and their labourers in many instances placed in a state of great suffering and privation.

Portions of the diseased plant were shown under a powerful microscope.

Dr. Macadam being called upon by the President to give the result of the examination of his pupils, reported that the successful candidates were Mr. John Thomson, Mr. James Crease, and Mr. William Grigor. Dr. M. stated the result of these examinations on Chemistry to have been most satisfactory. The oral examinations, which were conducted weekly, were, generally speaking, most excellent; but the written replies for the President's prizes far surpassed his expectations, more especially in the case of the first successful student. In order that the meeting might comprehend the relative value of the questions and answers, he submitted the following, with corresponding numbers attached, to enable those present to judge of the proficiency of the gentlemen who competed:—

WRITTEN EXAMINATIONS.—RELATIVE VALUE OF ANSWERS.

FIRST EXAMINATION.	Full Value.	Mr. John Thomson.	Mr. James R. Crease.	Mr. William Grigor.
1. Describe the English process for manufacturing Sulphuric Acid	12	12	5	5
2. How is Olefiant Gas (heavy carburetted Hydrogen) prepared, and what is its composition?	8	8	5	3
3. State how SO_2 may be prepared, and name its more important properties	12	12	7	—
4. Describe the process followed in the preparation of Nitric Acid	8	8	7	7
5. State the composition and properties of CO_2	12	10	4	8
6. State what occurs when a candle is plunged in O, H, N, CO_2, SO_2, respectively	15	15	13	10
Total First Examination	67	65	41	38
SECOND EXAMINATION.				
1. State the tests by which H Cl is distinguished from H Cy	8	8	7	3
2. What substances are represented by the formulæ C_4 H_5 O, HO; C_4 H_5 O; C_4 H_3 O_3; C_2 N	8	8	7	8
3. Give the Tests for Lead	12	10	12	7
4. State the composition by weight of Calomel and Corrosive Sublimate	8	8	—	3
5. Name the Antidotes for PbOA and Hg Cl	9	9	3	5
6. How does Grape Sugar differ from Cane Sugar?	12	12	2	3
Total Second Examination	57	55	31	29
Ditto First ditto	67	65	41	38
Grand Total	124	120	72	67

The President called on Mr. Thomson to receive the first prize, which was a copy of Hooper's *Medical Dictionary*. Mr. Crease and Mr. Grigor were then severally presented with a copy of Royle's *Materia Medica*.

An especial vote of thanks was proposed by Mr. Mackay to Dr. Macadam, for the interest he had manifested in the prosperity of the Pharmaceutical Society. His lectures had been well attended, and he considered the best evidence of his successful mode of imparting knowledge in the science of Chemistry to have been well proved in the presentations just made, and expressed a hope that his valuable services might for the future be obtained on behalf of the Society.

Mr. Macfarlan seconded this, which was carried by acclamation.

Dr. Macadam replied, and the Chairman read his

VALEDICTORY REMARKS.

Before briefly reviewing the proceedings of the North British Branch of the Society during the session now closing, I must congratulate the Members upon the successful termination of the action at law in which the parent Society was engaged, and I do not think there is the least reason to fear that Lord Campbell's verdict will be disturbed should the recklessness and bad taste of our opponent be still further evinced by carrying his action to another court. Let us hope that for the future an undisturbed union may be maintained amongst us, and that each Member will do all in his power to promote the prosperity of the Society and to forward the important objects for which it was formed.

The North British Branch during the past session has held five scientific meetings, which have upon the whole been numerously attended, both by Members and Associates.

At the first meeting in October, when the session commenced, a very interesting paper was read, illustrated by diagrams, by Dr. Macadam, "On the Distribution of Iodine in the Mineral, Vegetable, and Animal Kingdoms;" and the same gentleman also exhibited specimens of the collodion balloons, carbazotic acid, and carbazotate of ammonia.

At the second meeting, in December, Professor Christison favoured the Society with a most admirable address, which was listened to with great interest. Whilst exhibiting in vivid colours the almost immeasurable distance that has existed, and to a great extent still exists, between Continental Pharmacy and that of Great Britain, and tracing it to what must be considered its true cause, viz., the want of legislative protection, the learned professor bore testimony to the important move made by the Pharmaceutical Society in the right direction ; and if the Associates and Apprentices of the present day only pursue the course of study and the means pointed out by Dr. Christison, there is every reason to believe that the Pharmaceutist of this country will soon take a respectable place at least in the scientific world.

At this meeting Mr. Mackinlay gave a very admirable exposition of the science of photography, which evinced a thoroughly scientific and practical acquaintance with this most interesting science. Some very interesting specimens of the art were exhibited. Mr. Mackay exhibited and explained the French mechanical leech.

The third meeting took place in January, when Mr. Mackinlay communicated his concluding paper on Photography ; and Mr. Macfarlan read a paper on what had been supposed to be a new variety of cochineal from South America, communicated by Dr. James Stark.

At the fourth meeting in March we were indebted to our valuable Secretary for a paper upon water in reference to its action upon lead ; and to Mr. Shaw for an interesting account of the Anacharis Alsinastrum, with specimens of the plants. Prior to the meeting a committee was appointed by the council to take the necessary steps to comply with the request of the Pharmacopœia Committee of the parent Society in reference to the list of drugs and preparations transmitted to the Members. This committee has had three meetings, each of several hours' duration, to enable the Members satisfactorily to comply with the request.

The fifth and last meeting for the session is the one now held.

The lectures on Chemistry given by Dr. Macadam have been quite as numerously attended as was anticipated, and I am glad to state that the pupils have been regular in their attendance, and have made very satisfactory progress, as is sufficiently evinced by the fact that Dr. Macadam has considered three pupils out of about eighteen worthy of a prize.

Mr. Macfarlan moved a vote of thanks to Mr. Baildon, whose term of office soon came to a close, which was carried unanimously.

The Chairman, before separating, proposed a vote of thanks to the Secretary, for the time and trouble he had bestowed upon the affairs of the Society. Mr. Mackay replied, and the meeting separated.

THE ANNUAL MEETING.

MR. BAILDON IN THE CHAIR.

The Chairman, having briefly stated the object of the Meeting, called upon the Secretary to read the

ANNUAL REPORT.

The Council of the North British Branch of the Pharmaceutical Society have much pleasure in submitting to the Meeting this their Annual Report for 1854:—

The opposition which had at one time assumed a threatening aspect on the harmonious operation of the Society has now been overcome. A verdict emanating from one of our highest authorities, and of a nature at once clear, minute, and decided, has ratified what had long been felt by the almost unanimous vote of the Society to be correct. Had the eminent Judge who gave the decision been one of our most interested and zealous members, his judgment could not have shown a more perfect acquaintance with the internal working of the laws regulating the existence of the Pharmaceutical Society. The Council cannot therefore allow the present opportunity to pass without congratulating the Meeting on the termination of the tedious and vexatious proceedings which, chiefly on the part of one individual, have now for so many months interfered, to a certain extent, with the progress of the affairs of the Society, and they entertain a confident hope, that those parties who have held back from taking a part in the business of the Society, both here and elsewhere, under the fear that complete disorganization might be the ultimate result of the

opposition referred to, will now come forward and aid us with their assistance and support.

The Council can, in a very satisfactory manner, refer to the proceedings of the Branch here during the last year, as confirming what has been more than once previously referred to, the influence of the Society in inducing a desire, both on the part of Members and Associates, to improve their respective positions. The number of Scientific Meetings is a proof of this in the first instance, and the attendance on Dr. Macadam's instruction on Chemistry is a proof in the second. The Council feel that the Society is much indebted to Dr. Macadam for having so kindly come forward to supply a want which has been long acknowledged to exist, viz., a course of lectures, delivered in the evening, at such an hour as would suit the convenience of those who, during the day, were so closely engaged with counter duties, as to have been quite precluded from attending theoretical Chemistry in any other manner than the one so successfully adopted by Dr. Macadam. The Council are exceedingly desirous to continue and extend such arrangements in time to come, and hope the Council in London will second the efforts which shall be made on behalf of young Pharmaceutists during the present year and next winter session.

The Museum and Library have both received considerable, and in some cases valuable, additions during last year, and the Council take this opportunity of thanking those who have contributed to keep these departments in so flourishing a condition. Some really useful books are now to be found in the Library, and the Council will be glad that more advantage be taken by those entitled to use these volumes, as every facility has been, and will continue to be given by the Library Committee, for sending out and receiving back the various works now comprised under the book list, which is to be found on the table of the Museum room.

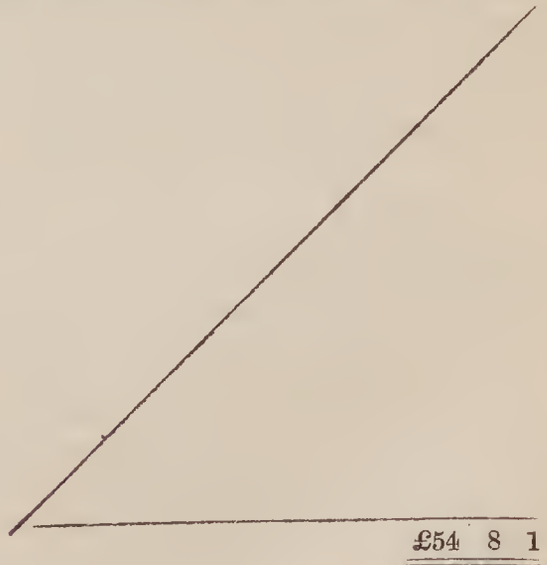
The funds of the Branch Society have been very carefully managed during the bygone year by the Committee, but as the cases in the Museum are now more than usually crowded, they contemplate adding some additional accommodation, in order that the specimens, which are fast accumulating, may be shown to greater advantage. The following is a statement of the Secretary's intromissions in connexion with the Branch expenditure, from 1st January to 30th December, 1854.

THE NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY IN ACCOUNT WITH THE SECRETARY.

Dr. *December* 31, 1854. *Cr.*

No. of Vouchers.		£	s.	d.
	Postage Stamps	2	9	9
1 & 2	Advertising	1	12	3
	Porterage, delivering billets, attendance at door of meeting, &c.	1	2	6
3	Various Taxes	6	8	8
	Writing-paper, Envelopes, &c.	0	10	6
4, 5 & 6	Hire of Seats and Upholsterer's account	2	15	9
7	Rent, less taxes payable by landlord	20	9	0
8, 9, 10 & 11	Printer's accounts	6	13	6
12	Trays for Specimens	0	16	0
	Cleaning Rooms, and Coals	0	10	9
13	Gas Fittings	0	12	8
14	Plumber Work	3	15	0
15	Water Duty, Brushes for Carpet, &c.	0	11	1
16	Books for Library	5	3	0
	Periodicals for ditto	0	17	8
		£54	8	1
	Balance due to Secretary	£4	8	1

	£	s.	d.
By Cash from London	50	0	0
Balance due Secretary	4	8	1
	£54	8	1



We, the undersigned, have examined the foregoing accounts, with vouchers attached, and find them correctly stated; and that the balance due to the Secretary is the sum of four pounds eight shillings and one penny sterling.

Edinburgh, 11*th April*, 1855.

James Gardner.
John Shaw.
John F. Macfarlan.

The Council, in closing this Report, beg to express the hope that ere long some good may be derived from the efforts now being made by the Royal College of Physicians to remodel, improve, and assimilate the various Pharmacopœias, and are glad to find that in London a Committee of the Society has already been appointed to confer with a Committee of the College on this very important and much-to-be-desired object. They also hope that continued prosperity may attend the progress of the Pharmaceutical Society ; and as years roll on, practical evidence may be given of the improved condition of those who have united for the purpose of improving education, and raising the position of a class of persons who, previously to the formation of this Society, had been gradually degenerating.

Edinburgh, 12*th April*, 1855.

Mr. Robertson moved that the Report now read be received and adopted, which was seconded by Mr. Macfarlan, and carried unanimously.

The Chairman proposed that Mr. James Gardner be elected President of the North British Branch of the Pharmaceutical Society for the following year, and Mr. James Robertson, Vice-President, which was unanimously agreed to.

Mr. Aitkin proposed as members of the Council for the ensuing year Messrs. Macfarlan, Baildon, Hart of Glasgow, Flockhart, Shaw, Ainslie, Brown of Dunfermline, Young, Bremner, G. Blanshard, Anderson of Musselburgh, Mackay, the President and Vice-President of the Branch Society, *ex officio*. This was seconded by Mr. Bell, and carried *nem. con.*

Mr. Bremner proposed the following gentlemen for recommendation to the Council as Examiners :—Messrs. Baildon, Gardner, Robertson, Flockhart, Shaw, Macfarlan, Mackay, Tait, President and Vice-President of the Society, *ex officio*. Seconded by Mr. Young, and carried.

The Chairman proposed that Mr. Macfarlan be requested to continue his labours in the Council of the Pharmaceutical Society.

Mr. Macfarlan observed that the lot having fallen on him, to remain another year on the Council, he should not require to be re-elected. He should have much pleasure in using his best exertions for the welfare of the Society. It was not expected that Members residing at a distance should attend all meetings of the Council in London, but he would be glad to attend whenever occasion required.

Mr. Flockhart proposed that Messrs. Ainslie, Shaw, Young, and Wm. Baildon, be appointed Curators of Library and Museum for another year. Seconded by Mr. Kemp, and carried.

Mr. Baildon proposed that Mr. Mackay be requested to continue his services as Secretary. In moving the resolution, he took occasion to advert to the zeal and ability displayed by Mr. Mackay in the discharge of his duties, his uniform kindness and courtesy to the Members, and the essential services he had rendered to the Society, in keeping up the spirit of the Pharmaceutical Meetings, and conducting the correspondence of the Society. Carried by acclamation.

Mr. Jacob Bell, in the course of the meeting, made a few remarks on the state and prospects of the Society. He had attended an examination in those rooms the day before, and was glad to find the mode of proceeding in accordance with the practice of the Board in London. It was desirable to secure uniformity of qualification at the two Boards. With regard to the legal proceedings, he observed that the case had not finally terminated, as the prosecutor had given notice of an appeal; but he scarcely thought he would be so foolish as to bring it into another court, after so clear and positive a decision in the Court of Queen's Bench. It had been intimated that the proceedings might be stayed if the Council would consent to forego the claim of the Society to costs: but the Council did not feel justified in entertaining any such compromise. (The meeting expressed a general approval of this decision.) At the conclusion of the ordinary business, Mr. Bell directed the attention of the meeting to the proceedings of the Pharmacopœia Committee appointed by the Society in London to assist the Pharmacopœia Committee of the College of Physicians, and suggested the appointment of a similar Committee by the North British Branch of the Society, to co-operate with the College of Physicians in Edinburgh, in the hope of paving the way for the publication of a National Pharmacopœia.

The Chairman said that on receipt of the communication with the lists of Materia Medica from the Council in London, a sub-Committee had been appointed

to consider the same, and they had been transmitted with some suggestions and remarks to the President of the Society. This Committee was dissolved on the completion of the duty for which it was appointed, but could be re-appointed as a Standing Committee if the meeting should think it desirable.

After some little discussion, in which the Members generally, including several from a distance, supported the proposal to appoint a Pharmacopœia Committee, it was finally decided unanimously to refer the subject to the new Council. It was further agreed that the proposed Committee, on its appointment, should enter upon the consideration of the preparations of the Pharmacopœia in correspondence with the Committee of the Society in London.

Thanks having been voted to Mr. Bell and to the Chairman, the meeting separated.

THE DINNER.

The annual dinner of the Members took place in the evening after the meeting. The party, about forty in number, dined at Douglas's Hotel, Mr. James Gardner occupying the chair, and Messrs. Robertson and Brown being croupiers. Among the Members present were Messrs. Williamson and Urquhart of Aberdeen, Messrs. Murdoch, Hart, and Kennedy of Glasgow, and Mr. Browne of Dunfermline. At the conclusion of the dinner it was announced from the chair that apologies had been received from Professor Christison, Dr. Douglas Maclagan, and Dr. George Wilson (hon. Members of the Society), Dr. Begbie (President of the College of Physicians, and Dr. Inglis (President of the College of Surgeons), who expressed their regret at their unavoidable absence. The occurrence of the annual dinner of the Harveian Medical Society on the same day, was the cause, except in the case of Dr. Wilson, who was prevented by indisposition. After the usual loyal toasts, the following were proposed and warmly responded to :—The Pharmaceutical Society, the University of Edinburgh, the Colleges of Physicians and Surgeons, the hon. Members of the Pharmaceutical Society, Mr. Bell and the Members from a distance, the President and Council in London, Dr. Macadam and the visitors present, Pharmaceutical Education, the Town and Trade of Edinburgh, Glasgow and its Commerce, the Chairman, Croupiers, and Mr. J. F. Macfarlan. In the course of the evening, Mr. Williamson, of Aberdeen, stated that he attended with Mr. Urquhart, as a deputation, and should have been present at the Annual Meeting held that day, but in consequence of a misunderstanding as to the hour of meeting (which they had believed to be three o'clock) they had not been in time. If they had known the hour was twelve they would have come the day before. He said the Members in Aberdeen had been considerably discouraged by the legal disputes in which the Society had been involved, and which threatened most of them with expulsion. Unless some steps were taken to revive the spirit of the Aberdeen branch of the Society, he feared the Members would fall off, and it would be difficult to induce Apprentices to join the Society if they had no Board in Aberdeen to which they could apply to pass the Classical Examination. The deputation had been requested to lay the following communication before the meeting :—

"*Aberdeen, April 11th*, 1855.

"At a general meeting of the Aberdeen Branch of the Pharmaceutical Society, held in the Committee-room, on Wednesday, April 11, Mr. David Reid in the chair, it was unanimously resolved to send Messrs. Williamson and Urquhart as a deputation to Edinburgh to attend the Annual Meeting of the Society, to be held on Thursday, 12th April. The members of the deputation were specially requested to bring before the meeting the two following proposals :—First, that a Board be appointed in Aberdeen for examining Apprentices. Second, that as it is most desirable that a regular course of Chemistry be given in connexion with the Aberdeen branch of the Society, and that the services of the Assistant Professor of Chemistry in Marischal College be secured ; to enable the members in Aberdeen to effect this object, a grant from the funds of the Society be voted.

"David Reid, *Chairman*."

Mr. Macfarlan suggested that the communication should be forwarded to the Council in London, and Mr. Bell undertook to convey it, observing at the same time that the object of the first proposition was in the hands of the members in Aberdeen, who could appoint two or more competent persons to perform the Classical Examination, and that the certificate of such examiners would be received by the

Council in London. The second proposition would require some consideration, but he would lay it before the Council.

Mr. URQUHART, while he was desirous of promoting the Society and extending its influence, thought the members in Aberdeen had some claim for a grant, as they had hitherto received little or no equivalent for their subscriptions to the Society. They had a valuable library in Aberdeen, which had been in progress of formation for many years, and which he should be glad to see handed over to the Society upon such terms as might be mutually agreed upon.

Mr. BELL, in reply, observed that the Members in the South had subscribed for about fourteen years, in the first instance two guineas, and lately one guinea, per annum, for which they had received comparatively little advantage until they obtained an Act of Parliament, which conferred on all the Members a status and professional character. They offered to their brethren in Aberdeen at the eleventh hour the full enjoyment of this benefit in common with themselves, who had borne the burden and heat of the day. The object was a public one, in which all must unite, and none should object to a small pecuniary sacrifice for supporting a Society whose ramifications extended throughout the kingdom, and whose influence in advancing education and protecting their general interests could not be too highly estimated.

Mr. MURDOCH of Glasgow, in responding to a toast, took occasion to explain the difficulty they had hitherto experienced in establishing scientific meetings in Glasgow. He said the number of members was small (scarcely more than twenty) on account of the union of medical practice with Pharmacy in Glasgow. A considerable number of those who had Chemists' shops were in fact medical men, practising under diplomas of the Faculty of Physicians and Surgeons of Glasgow, and therefore not admissible as Members of the Pharmaceutical Society. The legal proceedings had also retarded their progress, as they were in doubt as to their tenure of membership. He hoped that they should by degrees establish an effective branch of the Society in Glasgow, where they had facilities for attending the classes of Chemistry, &c., at the University.

All the speakers appeared to be animated with a warm interest in the Society, and in the progress of Pharmaceutical education. The prospect of effecting an amalgamation of the London, Edinburgh, and Dublin Pharmacopœias was discussed, and the proposal warmly supported. It was considered to be a satisfactory evidence of the advancement of their character as Pharmaceutists, that the medical colleges had evinced a disposition to confer with them and obtain their co-operation in the practical manipulations connected with the Pharmacopœia. It was also the unanimous opinion of the Members present, that much advantage arises from periodical meetings of a social nature, the tendency of which is to promote friendship and harmony, and thus to cement the union of the Members in the more important objects of their Association, namely, the advancement of Pharmaceutical education, and the professional status of their body. The discussion was proceeding with much animation (enlivened by an infusion of vocal harmony), when the clock struck eleven, and the landlord said it was his duty to remind them of the fact, a recent Act of Parliament having fixed eleven o'clock as the *hora somni* for Scotland. Upon this intimation, the meeting adjourned until next year.

The following is the programme for the instruction during the present session in

PRACTICAL CHEMISTRY.—EVENING CLASSES.

DR. STEVENSON MACADAM, F.R.S.E., will commence evening courses of instruction in PRACTICAL CHEMISTRY, on Friday, the 4th of May, in the Rooms of the Pharmaceutical Society, 72, Princes Street. Hours 8 to 9, and $9\frac{1}{4}$ to $10\frac{1}{4}$ P.M.

These classes will meet on the Tuesday and Friday evenings during May, June, and July, fee £1 5*s*. Members, Associates, and Apprentices of the Pharmaceutical Society, and Assistants and Apprentices to Pharmaceutical Chemists are admitted to either class at a fee of £1 1*s*. JOHN MACKAY, *Secretary*.

72, *Princes Street, Edinburgh*.

MANCHESTER CHEMISTS' CONVERSATIONAL SOCIETY.

ANNUAL REPORT.

The Committee of the Chemists' Conversational Society, in presenting the third report of its proceedings, desires, in the first instance, to review the Society's transactions, in reference to the monthly evening meetings which have been held during the past year.

The proceedings of the Society were opened by the President, who detailed the various means which had been employed in Manchester at different periods for the promotion of Pharmaceutical education, adverting to the origin of the existing Society.

Professor Calvert then addressed the students of the Chemical class, who were specially invited to attend on this occasion, forcibly urging the necessity of a scientific education for the legitimate and successful discharge of the duties of the Pharmaceutist.

Prizes were then awarded to two of the most diligent students of the Chemical class, kindly given by the President, viz.:—*The Life of Dalton*, by Dr. Henry, and Royle's *Materia Medica*. On the succeeding meetings papers were read by Mr. Woolley, "On the Materia Medica of the Pharmacopœia;" by Mr. Grindon, Botanical Lecturer to the Pine Street Medical School, "On the Importance of Botany as a Branch of Education to the Pharmaceutical Chemist;" by Mr. Mumbray, "On the Medicinal Plants comprised under the Family Convolvulaceæ;" and at the last meeting, Mr. Woolley exhibited and described an apparatus recently contrived by Dr. R. Angus Smith, for the estimation of the amount of gases in water.

Discussions of an instructive character have followed the reading of the papers, and objects of interest have occasionally been exhibited.

It is much to be desired that every Member would make an effort to be present on these occasions, thereby giving encouragement to those who give the time and trouble for the preparation of a subject for the meetings, and also by their presence and observations contributing life and interest to the discussions.

In accordance with a resolution passed at one of the meetings, three scientific journals have been ordered for the use of the Society. The want of interest manifested in the general affairs of the Society, however, has deterred the Committee from making any definite arrangement for their circulation at present.

The only other feature of the Society's operations which remains to be noticed, is the course of instruction to the students in the Chemical class, which has been given two days in the week conjointly by Professor Calvert and Mr. Hunt. The number of students who entered this class was 24. The average attendance has been about 20. The course, which was to consist of forty lectures, is just about concluded. As supplementary to this, Professor Calvert has kindly offered to deliver a few lectures on Toxicology. In addition to the prize which will be offered by the Society, Mr. Calvert has promised to give another on his own account.

The Committee are happy to state that they hope to succeed in the formation of a Botanical Class for the Summer, and believe they shall have the good fortune to obtain the services of Mr. Grindon for this object.

The Committee are also happy in being able to congratulate the Members on the state of the Society's funds, so that if the transactions as yet have not been very extended, or the beneficial results all that could have been desired, it is at least satisfactory to know that its future operations will not be abridged by the effect of a standing debt.

James Roberton, *Hon. Sec.*

ORIGINAL AND EXTRACTED ARTICLES.

NOTES UPON THE *MATERIA MEDICA* OF SCINDE.

(*Concluded from the last Number.*)

INORGANIC SUBSTANCES.

72. Zift Roomee. Asphaltum? O'Shaughnessy, *Bengal Disp.*, p. 673. It is applied in Scinde externally as an aphrodisiac, and is very costly.

73. Moomiyayee. Bitumen. Nos. 615, 1391, *Ulfaz Udwiyeh. Muminahi* seu *Mumia nativa Persica.* Kæmpfer, *Amœn.*, p. 516.

A brilliant, black, bituminous substance, much esteemed in Scinde and elsewhere for its virtues in setting bones. "Ossibus verò glutinandis tantâ claret efficaciâ," says Kæmpfer, "ut fracturas crurum in animantibus paucis diebus, in pueris quidem triduo, in pullis gallinaceis intra diem vertentem, modò ritè reducta sint, firmare et ad usum stabilire credatur."

It is used as a plaster, and likewise administered internally.

74. Fullee. Impure carbonate of soda found in Scinde.

75. Jow Khar. *Jewa-khar.* No. 1408. *Ul̤faz Udwiyeh.* Found to be sulphate of soda.

76. Carbonate of soda.

77. Kungun Khar. Borax.

78. Boorah Armenee. *Booreh Urmeny*, No. 560, *Ul̤faz Udwiyeh.*

It consists of greyish, rounded masses, compressible between the fingers, and showing, when broken, a mass of small, white, silky crystals. It is composed of the borates of soda, lime, and magnesia.

79. Sufé̤d Soormah., literally *White Antimony*, is Fibrous Limestone.

80. Sung Shah Maksood, *Mineral Bezoar;* a compact, greenish-yellow, magnesian limestone, used for beads in rosaries, and supposed to give strength.

81. False *Maksood.*

82. Sung Lajvurd. Lapis Lazuli.

83. Sunjarah. Steatite.

84. Sunjarah Subz. Green steatite.

85. Yushm. A small carved jade-stone amulet. Jadestone, under the name of *Lapis Nephriticus*, was formerly superstitiously employed in English medicine; and, as such, is enumerated in the copious lists of Materia Medica of the earlier London Pharmacopœias.

A small amulet of this material set in silver, and a very fine one of oriental workmanship covered with Arabic characters, are preserved in the collection of the Royal College of Physicians.

86. Sochur-loon. Alum.

87. Phitkee. Alum. Made in Scinde from the efflorescent salt called *Feather Alum.*—J. E. S.

88. Pah. Impure sulphate of alumina. It is made in Scinde from the shale (No. 89), by powdering it and sprinkling it with water, a few days after which the *Pah*, or alum, makes its appearance. This crude alum is used in calico dyeing.

89. The *Shale* above referred to.

90. Mét. Fuller's Earth (?) found in Scinde, and used for cleaning the hair, and for cleansing calico cloths for dyeing.

91. Met Jangree. An earth something like No. 90. It is also found in Scinde, and used in dyeing.

92. Khurree Muttee. An earth used for covering wooden tablets; on which, when thus prepared, schoolboys write their exercises.

93. Hurmajee. *Hejr Urmenee?* No. 780, *Ul̤faz Udwiyeh.* A bright red, soft, argillaceous earth in irregular lumps, which, when immersed in water, speedily crumble into a fine powder, which does not effervesce upon the addition of an acid.

94. Sona Geeroo. A red earth or bole in lumps, somewhat harder than No. 93, but like it, not effervescing with hydrochloric acid.

These substances represent *genuine* Armenian Bole, as formerly imported into Europe, that now employed here being, as is well known, a *factitious* article.

95. Gil Armenee. *Gil Urmenee;* No. 1143, *Ul̤faz Udwiyeh.* O'Shaughnessy, *Bengal Dispensatory*, p. 693. The substance received under this name consists of a red earth, somewhat like the preceding, but effervescing strongly upon the addition of an acid.

96. Jist. Zinc. Said to be brought from China. An oxide is made from it.

97. Sung Busree, *Bussorah Stone.* No. 636, *Ulfaz Udwiyeh.* No. 823, *Taleef Shereef.* Ainslie, Mat. Ind. i., 573.—*Tutty.* It is used to "strengthen the eyes."

98. Sung Rasikh, *Antimony Stone*, is the variety of oxide of iron known as *Micaceous Iron Glance.* It is used with the *Bussorah Stone*, No. 97, to strengthen the eyesight.

99. Soormah Soorkh, translated *Red Antimony*, is Micaceous Oxide of Iron.

100. Khoobsuldeed. No. 143 and No. 830, *Ulfaz Udwiyeh*, where it is rendered *Rust* or *Dross of Iron.*

It is a dark rusty powder, made by the native *Hukeems* from the débris of the blacksmith's forge, and is administered as a tonic.

101. Sung Ahun Ruba. No. 774, No. 1382, *Ulfaz Udwiyeh*, where it is correctly rendered *Loadstone.*

It is used, or pretended to be used, for extracting needles and iron bullets from the body, and is very dear.

102. Subzee.

103. Dalchichnah. Corrosive Sublimate. It is used in alchemy, and is very dear.

THE CIVIL HOSPITAL AT SMYRNA.

March 24, 1855.

COMMUNICATED BY MR. JOSEPH INCE.

I AM indebted to the kindness of Mr. Plumeridge, of 30, Conduit Street, for the following extract from a letter written to him by Mr. James, one of the newly appointed dispensers at the Civil Hospital at Smyrna. His remarks are interesting, as being the actual experience of a Chemist's Assistant. Some portion of the letter is occupied with a description of the jealousy existing between the Civil and Military Departments, the whole of which I have thought better to omit.

"The hospital is a three-sided building, the sea forming a fourth. Its position would be preferable if on higher ground, as there is a fear of fever during the hot summer months. We found the surgery destitute of any preparation of Catechu, Kino, Henbane, or Squills, with no better tonic than Gentian. We certainly had *some* Quinine, but otherwise we were very badly off. For the first few days we used a pound of Quinine per diem, but now not half the quantity. The authorities said at one time that they found its good qualities did not produce the desired result; but this was owing to its having been prescribed in doses of two to four grains—it is now found requisite to give ten grains before it takes effect. Several of our Physicians prescribe eight grains, three times a-day. On our arrival we found 900 patients; out of that number 200 were convalescent, and as many more fast approaching to it. Imagine a poor man's feet swollen four times the natural size, five pieces of bone where flesh once formed, the toes and roots resembling a bruised ripe plum, and then you have a specimen of Crimean frost-bite. The diarrhœa cases present a still more horrible appearance. There seems to be no flesh on the entire body. There was a Highlander in this condition, with his head shaved, his eyes three times their natural size, his cheeks sunk in, and his thigh bones projecting through his skin. The skin itself, in a protracted diarrhœa case, becomes dry and grisly, while the unhappy patient retains his senses to the very last. Of course, in a hospital such as this, there are many victims whom no earthly care can save from death. The nurses (lately arrived) have already worked a great change for the better. Beef-tea, arrowroot, and sago, are served out with the utmost regularity. There are twenty lady nurses, and twenty-two paid ones. The deaths vary from three to six per diem—coffins are not obtainable, wood being very scarce; the corpses are wrapped in a kind of coarse calico-stuff instead, and three are buried in one grave. Lime is then sprinkled over to the depth of about four feet."

Next follows a description of the daily routine.

"We commence work at half-past nine o'clock, and have very hard dispensing until two o'clock, when there is a cessation, and only one remains on duty for the remainder of the day, who returns to the surgery at four o'clock. He is then employed from four to five o'clock, and again from eight to nine o'clock. There will be an orderly room for the one on duty, in which he will take his meals, and sleep, being always liable to be called up during the night. We breakfast at half-past eight o'clock; lunch at two o'clock, on bread and cheese and half a pint of wine; dine at six o'clock, and go to bed at ten o'clock—rather different to London hours.

"When the hot weather comes we shall have to get up much earlier; the present hour is seven o'clock.

"Wine is very cheap, sixpence per quart bottle, and very good. Fruit is very moderate. Horses are hired at two shillings and sixpence a day. Boats or gondolas, a dollar for the evening. Tobacco is cheap, cigars are bad, but cigarettes, which everybody smokes, are twelve a penny. Our living costs within two shillings a day. The washing is done by one of the soldier's wives at ten shillings a month, which seems rather dear.

"If any of your acquaintances are coming out, by all means advise them to bring *their own* portable *iron* bedstead, a looking-glass, a canteen, and a telescope."

(What is the particular advantage of the last-named instrument to a dispenser, I am at some loss to imagine; but knowing from personal intercourse with Mr. James, that he has been for a long time on the look-out at home, I suppose that he cannot easily give up the habit, now he is abroad.)

The communication ends with an animated view of the knavery of the low Greek tradesmen.

The entire arrangements of the hospital seem to be regulated in the best possible manner, and reflect the highest credit on our home medical directors.

31, *Southampton Street, Covent Garden.*

BOTANICAL RAMBLES AT SCUTARI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The object of my troubling you with this communication is to furnish some of your readers with a short sketch of the botanical rambles enjoyed by a dispenser of medicine serving at Scutari. Before I proceed with my unscientific and imperfect description I must claim the indulgence of your readers, in consequence of my incapability to do justice to the subject which I have undertaken for the information of my fellow-assistants, who, doubtless, have numerous friends and acquaintances holding similar appointments, and will be gratified to know that those who have enjoyed the good fortune of attending a course of Mr. Bentley's lectures have opportunities of pursuing pleasure derived from the kindness and solicitude all have experienced who have had the honour of being his pupils.

I arrived at Scutari on the 30th of December, 1854, and found very little to interest me, for at this season of the year vegetation has expended its vigour and beauty, and slumbers for a few months again to resume its existence and throw forth its attractions with renewed vigour.

Leaving my quarters on the right of the Barrack Hospital I walk up the hill which leads to the Cemetery, and wend my way across the graveyard, towards the opposite mountains. Immediately you emerge from the streets innumerable objects of interest attract your attention. The green grassy sward is studded with a very pretty plant belonging to the family Liliacæ. The *Crocus verus* is very plentiful on the commons; some are of a rich purple colour, others of a pure white. A few minutes' walk and you reach the celebrated cemetery; after winding one's way through this forest of cypress-trees, tumbling over human bones, fragments of grave-stones, &c., and thrusting your legs into a few old dilapidated graves, you are rewarded with a view such as my humble words cannot possibly do justice to. The

Amygdalus communis is everywhere in bloom; each side of the valley in front abounds with vineyards, wheat-fields, strawberry-gardens, &c. A few houses are scattered at various distances, which adds greatly to the picturesqueness of the scene.

A beautiful brook intersects the valley, with its mimic waterfalls and miles of marshes. Following its course towards the Sea of Marmora will be found hyacinths in abundance, and acres of the *Galanthus nivalis*, growing to a much greater height than any I have witnessed in England. The sides of the streams, in favourable positions, will be found carpeted with flowers of almost every description. I classified this morning twenty specimens belonging to distinct natural orders, all of which were collected within ten square yards ! ! Beautiful specimens of *Boraginaceæ*, *Cruciferæ*, *Rosaceæ*, *Liliaceæ*, *Compositæ*, *Labiatæ*, *Papaveraceæ*, &c., are found growing in luxurious abundance, without any reference to soil, which is to me a matter of surprise.

As you ascend the hills, which are at a great elevation from the level of the sea, the ground becomes more and more sterile. Thickets of prickly underwood impede the traveller's progress. At the summits of the mountains will be found plenty of rosemary, lavender, and mint; and also a very curious plant, which I have vainly endeavoured to become acquainted with. The peculiarity of the shrub is, that the flowers are neither axillary nor terminal, but grow from the middle of the lamina springing half-way up the mid rib; the fruit consists of a red berry, containing two seeds, each of which is enclosed in a separate loculus; the whole is about the size of a large pea; in other respects resembling an apple, with its superior persistent calyx, &c. The leaf of this plant is simple and acuminated. I have also collected on the mountains (in fact, all the forest of underwood I have seen here consists of it) a specimen which I believe belongs to the *Cupuliferæ* tribe. It has the fruit of the oak, and the leaf of the *Ilex aquifolium*. I have shown this specimen to a number of medical men, and they are all ignorant respecting it. Similar excursions to the above are enjoyed by myself daily whenever the weather permits. The number of mountains, and the vast space of ground uncultivated, furnishes ample opportunities for enjoyment, and will offer fresh pleasures to every successive ramble. As I prosecute this science as one affording both interest and attraction, I may justly believe that our Pharmaceutical friends at home will be glad to know that all connected with the Society have the opportunity of pursuing a healthful recreation, entirely through the instrumentality of the Society. Knowing the anxious solicitude at all times evinced by the Council for its Pupils, I am induced to trouble you with this imperfect description, feeling assured you will be glad to know, although on "actual service," we still have ample opportunities of acquiring knowledge.

I have the honour to be, Sir, your obedient Servant,

General Hospital, Scutari,
April 4th, 1855.

JNO. W. M. BREWER, A. P. S.

PRACTICAL RULES AND RECIPES IN ELECTRO-DEPOSITION.

BY GEORGE GORE, ESQ.

(*Continued from page* 469.)

31. There are two methods employed in making up depositing solutions, the one called the chemical and the other the battery process; the chemical process consists in preparing the ingredients by the usual chemical methods, and adding them together in certain proportions to form the complete liquid; for instance, the sulphate of copper coppering-liquid is prepared by dissolving a certain proportion of commercial sulphate of copper in water, and adding to it a certain proportion of sulphuric acid to form the free acid; or, to form the cyanide of silver and potassium ordinary plating solution, silver is dissolved in dilute nitric acid, and the aqueous nitrate of silver formed is precipitated by addition of aqueous cyanide of potassium; the white powder precipitate of cyanide of silver is washed, and then added as much as will dissolve to water containing a certain quantity of cyanide of potassium dissolved in it; after that a certain proportion of cyanide of potassium is added to form the free cyanide of potassium;—the battery process consists in taking some water and dissolving in it a certain proportion either of acid or salt, as the case may be, then hanging in it a large dis-

solving plate at the bottom of the liquid and connecting it with the positive pole of a battery, and a small receiving plate at the upper part of the liquid and connecting it with the negative pole, and passing a current of electricity through until the required proportion of metal is dissolved, which may be known either by weighing the metals before and after, or by passing the current until a clean receiving article receives a good reguline deposit; with the precious metals, gold and silver, the cathode is generally placed in a small porous cell containing some of the liquid, and the cell immersed in the original liquid to near its top edge; and by taking out the metal occasionally, and immersing it in the outer liquid, and observing if it receives a good deposit we may know when sufficient metal is dissolved, this prevents waste of metal by deposition; the liquid of the porous cell may be afterwards added to the other liquid;—for instance, if we wished to make some sulphate of copper solution by this process (which we should not do, the salt being cheap), we should take the same quantity of water as when we proceeded by the chemical method, and we should add to it as much acid as was contained in the salt of copper, together with some free acid as before, and then we should pass the current through by a large copper anode, as described, until as much copper was dissolved as the salt of copper when made up by the chemical process contained, which might be known by weighing; every 125 parts of the ordinary sulphate of copper contains $31\frac{7}{10}$ths parts of copper, 8 parts oxygen, 49 parts of the ordinary sulphuric acid, and 36 parts of water; or, if we wished to make up some cyanide of silver and potassium plating solution by the battery process, which is often done, we should take the same proportions of cyanide of potassium, dissolved in water, with the same proportion of additional cyanide of potassium to form the free cyanide as in the chemical process, and we should pass the current through by a large silver anode until the same proportion of silver was dissolved as by the other process.

32. Having obtained a good depositing liquid, the next question is how to work it properly. The following are some of the rules upon this point:—1st. Always avoid doing anything which will alter the composition of the liquid, or even the proportions of its ingredients, except the water, that may be altered in proportion with most liquids without inconvenience. 2nd. Adapt your electric power to the liquid, and not the liquid to the power, *i. e.*, regulate your deposit by alterations in the battery rather than by any alteration in the depositing vessel, excepting as regards the distance of the electrodes asunder, that may be altered with safety, and generally with convenience. 3rd. As a general rule, let your dissolving metal be larger than the receiving article.

33. There are two sources of electricity used by electro-depositors, viz., the voltaic battery, and magneto-electric machine; but the former is by far the most extensively used.

34. Of voltaic batteries there are several kinds in use by manufacturers, some preferring one kind and some another; the kind mostly used in Birmingham is the old zinc and copper battery, charged with dilute sulphuric acid, each pair consisting of two flat sheets of copper, with a plate of amalgamated zinc between, and prevented from touching them by a frame of wood; the zinc plate is movable, so that it may be raised and suspended any depth in the liquid as may be required, or be removed altogether at night after the work is done. Next to this kind of battery that of Professor Daniell is much used; also Mr. Smee's battery of platinized silver, the silver being stuck upon varnished boards, and the zinc plate suspended between them, as in the arrangement with zinc and copper already described.

35. The kinds of containing vessels used for the batteries are stoneware, glass, and gutta percha. The first of these is extensively used, and is not expensive. Glass is more expensive, especially for large vessels, but it has the great advantage of enabling you to watch the action of the batteries; it is very generally used for small batteries for experimental purposes, and is now being moulded into large vessels for batteries by some of the largest manufacturers

here. Gutta percha has also been tried, but possesses less advantage upon the whole than the other materials, being opaque, and rather expensive, and the zinc salt of the liquid passes very rapidly over its edges by capillary action.

36. The best kind of zinc for batteries, and the only kind now used by electro-platers, is the German or Liege zinc, manufactured by Morselman and Co. The thickness of the zinc plate varies according to the size of the battery; the smallest should never be less than one-eighth of an inch thick, on account of their brittleness when amalgamated. The zinc plates are generally taken out of the batteries after the work of the day is over, unless some articles in the vat have to go on coating all night. If the acid liquid in the batteries is very strong, and the electric action energetic, the zinc plates require often to be examined; *i. e.*, at least once every day, to see that there is no local action; and when gas is found to be freely rising from them, as well as from the silver or copper plates, or when any dull patches appear on them where the acid is acting too strongly upon them, they are taken out and amalgamated. If they are much worked it is economy to amalgamate them every few days. They should always be well amalgamated when they are new. When they become so thin as to fall to pieces on handling, new ones should be substituted.

37. New zinc plates are amalgamated by soaking them a quarter of an hour in water containing one-twentieth of sulphuric acid, then pouring mercury over them, and rubbing it all over with a hare's foot or piece of rag, using a hard brush for the refractory places; they are then washed in water, and drained for half an hour, to remove the superfluous mercury.

38. When Daniell's batteries are used, porous vessels are required to separate the two exciting liquids; they are of three kinds: earthenware, wood, and bladder; the first is the only kind now used in manufactories. They should always be kept soaking in clean water when not in use, in order to remove the salts of the battery from their pores.

39. The only kind of acid now used by electro-platers to excite their batteries, is the sulphuric; it is obtained in large quantities for about 1*d.* or 1½*d.* per lb. A good strength to use in batteries is one measure of acid mixed with twenty measures of water; it is often used as strong as one in twelve, but then the zinc plates require often amalgamating and constant watching, to prevent waste.

40. After a battery has been at work some time, its power diminihses; a little acid should then be added, and the liquid stirred up; this should be done as often as the power gets low, until at length the liquid becomes thick, and of an oily feeling, and the salt crystallizes about the edges of the vessel; it is then time to throw it away and put fresh; or it may be set aside, filtered, evaporated, and crystallized, and the zinc salt kept for making up zinc depositing solutions; the salt to make it quite pure should be re-dissolved, evaporated, and crystallized.

41. If any of the silver or copper plates of the batteries become coated with a deposit of zinc whilst working, it shows that all the acid in that cell is exhausted; either more acid should then be added, or fresh liquid altogether put in. The zinc may be removed from the silvers by immersing them (without their zinc lates) their full depth in a fresh battery charge of acid and water.

42. If copper plates are used in the batteries, they should be heated red-hot all over, once every week or ten days, and quenched in water, and then dipped in "dipping liquid," the liquid used by brassfounders to clean copper and brass; silver plates never require to be treated thus.

43. Copper is not so good a metal for the negative plates of batteries as silver, because the liquid acts upon it, and forms a salt which dissolves in the liquid, and reacts upon the zinc plate, and causes them to waste considerably, for this reason, copper plates cannot like silver ones be left in the liquid all night or at any other time when the battery is not working; besides, when it is taken out and lies exposed to the air, it becomes covered with a film of oxide, which considerably impedes the current of electricity on its re-immersion.

44. The depositing vessels are made of various materials; for small operations nothing succeeds so well as glass vessels, or a stoneware pan, but for large purposes, vats containing from fifty to several thousand gallons are used; they are usually made of wood, covered on the outside with sheet lead, but the very large ones, used for depositing life-sized figures in copper, have in some instances been built of bricks and lined with cement; the vats used for ordinary purposes are about two feet deep, three feet wide, and from five to twenty feet long, but those dimensions greatly vary in different manufactories, and depend upon the size and form of the articles generally plated in them.

45. In the vats used for general articles, such as spoons, knives, forks, plates, &c., the dissolving plates are fixed all round the sides of the vessel just beneath the surface of the liquid; in addition to this, vertical wooden frames are fixed at intervals of about two feet across the vat with dissolving plates upon them, just beneath the liquid's surface, and all the dissolving plates are connected together; the articles to be plated are suspended by small copper wires (size No. 20 of Birmingham wire gauge) from brass tubes resting across the vat upon two other and larger tubes passing all along the upper edges of the vat, and connected by a large copper wire with the negative pole of the battery, whilst the dissolving plates are connected by another large copper wire with the other pole of the battery; by the arrangement described, each row of the articles has dissolving plates all around it; the cross frames are movable, so that when large articles are to be plated, one or more of them may be removed to make room for them.

46. In depositing upon all articles with all metals, it is of the utmost importance that the battery power be properly regulated; there are a number of ways of regulating the quantity and intensity of the current, and they consist in making alterations either in the battery or in the depositing vessel, or in the wires connecting them; the *intensity* is increased by increasing the *number* of the pairs of battery plates, *i. e.*, the number of *alternations* of them; by increasing the proportion of acid to water in the battery liquids; by keeping the batteries warm; or by stirring the liquids in them; it is also increased by increasing the proportion of free acid or free cyanide of potassium (as the case may be) in the depositing liquid, especially if supplied near the dissolving plate; by having a linen bag filled with the metallic oxide or salt near the receiving article to neutralize the acid set free; by raising the temperature of the depositing liquid, or by keeping the dissolving metal hot, and the receiving metal cold; by putting the article and dissolving plate nearer together, and by stirring the liquid. The *quantity* of the current is increased by immersing the battery plates deeper in their liquids; it is also increased by all the means described for increasing the intensity. The general power of the current may be much weakened by interposing a long and fine iron wire in the circuit between the battery and the depositing vessel.

47. The best and most convenient practical means used in the manufactory for increasing the *intensity*, is to increase the *number* of pairs in the battery; next to this we may raise the temperature of the depositing liquid if it is contained in a suitable vessel; or we may place the articles in the vat nearer to the dissolving plates, by placing the cross frames with their dissolving sheets nearer together; but this is not generally convenient on account of the connexions:— and the most effectual means of increasing the *quantity* of the current is to lower the zinc plates of the batteries deeper into their liquids, for this purpose a strong screw should be attached to them; when a very small quantity of current is required, smaller than the ordinary large batteries can supply, and no small battery is at hand, it is usual to hang a piece of sheet metal in the depositing liquid from the same rod as the receiving article to receive a portion of the deposit, and thus take off a portion of the power.

48. A series of similar batteries may be connected together by wires, so as to give either a current of high intensity and small quantity, or of low intensity and large quantity, if they have suitable screws attached to each of the plates; thus,

supposing we have four pairs of battery plates in four separate cells, if they are all connected alternately thus:—zinc, copper—zinc, copper—zinc, copper—zinc, copper—with wires from the extreme plates, they will give a current having an intensity of four and the quantity of one; but if instead they are connected, all the zincs together by one wire, and all the coppers together by another wire, with one end of each wire left free for connexions, they will give a current having the intensity of one and the quantity of four; or if they be arranged in two rows, and each row connected intensity fashion thus:—

Zinc, copper——zinc, copper
Zinc, copper——zinc, copper

the end coppers of each facing one way and connected by a wire, and the end zincs facing the opposite way and connected by another wire, and these end wires left free for connexion with the vat, they will yield a current having the intensity of two and the quantity of two; by contrivances of connexion like this any number of batteries, providing they are similar, and have convenient screws attached (otherwise it does not succeed), may be connected together so as to give any proportions of quantity and intensity within the limits of their power; thus a battery of four pairs may be arranged to give an intensity of four and quantity of one; a quantity of four and intensity of one; or a quantity of two and intensity of two, but not a quantity of four with an intensity of four.

49. The *intensity* of the current depends upon the *number of alternations* of the metals, and it will be observed in the foregoing arrangements that where the intensity is equal to four there are four alternations of zinc and copper; whilst where it is equal to two there are only two such alternations; and where equal to one only one alternation; on the other hand, the *quantity* of the current depends upon the *quantity of immersed surface in each alternation*, other circumstances remaining the same; and it makes no difference whether that surface is composed of one or any number of battery plates, or whether they be in one vessel or in many separate vessels; thus, in the arrangements described, where the quantity is only equal to one, there is only immersed surface of metal equal to one in each alternation; where it is equal to two there is twice the amount of immersed surface in each alternation; and where it is equal to four there is four times the quantity of immersed surface in each alternation; in each case it is assumed that the amount of metal dissolved in a given time in each alternation is kept in exact proportion to the amount of immersed surface, and this is not the case if the acid liquid varies in strength or several pairs are connected together intensity-fashion, which drives a certain extra quantity through them.

50. With a good depositing solution and perfect battery arrangements the quantity of metal dissolved and deposited in the vat depends upon the quantity of the current passing, and consequently upon the quantity of metal dissolved in each alternation, be they few or many, in the battery; with an aqueous solution of sulphate of copper in the depositing vessel, and with all the materials in the vat and battery pure, and all the arrangements perfect, for every single "equivalent," or $32\frac{6}{10}$ parts zinc dissolved in each alternation of the battery, there would be one "equivalent," or $31\frac{7}{10}$ parts copper dissolved on one side, and the same quantity deposited upon the other in the depositing vessel.

51. But in the ordinary course of manufacture we never get all the materials pure, or all the arrangements perfect; on the contrary, from the low prices at which all the materials require to be purchased, the small amount to be given for labour, and the low prices at which all the apparatus have to be purchased, scarcely any of the materials are pure or arrangements perfect; the sulphuric acid sometimes contains a little nitric acid, which causes the zinc to waste; the mercury with which the plates are amalgamated nearly always contains tin or lead, which also causes waste of zinc; the zinc itself always contains some impurities, which is so much loss; oftentimes the acid liquid in the battery is too strong, or the plates not kept well amalgamated, or they are allowed to remain in the liquid when not in use, and all this causes waste of zinc; and then in the

depositing vessel the metal used to dissolve always contains some impurities, copper especially does, and these get into the solution; occasionally some of the deposited metal re-dissolves off in consequence of the accumulation of acid liquid exhausted of metal about the article for want of stirring; and then with some depositing liquids gas is evolved at the surface of the receiving article, and a portion of the battery power is thus wasted; and, finally, the repeated operation of "scratching" removes a small portion of the deposit; allowing for all these sources of loss, it generally takes from one-and-a-quarter to one-and-a-half pounds of zinc, and an equivalent quantity of acid and water *in each alternation* of the battery, to deposit one pound of copper.

52. Whilst the *quantity* of the deposited metal is regulated by regulating the *quantity* of the current, its *quality* is regulated by regulating the *intensity* of the current; by its "quality" I mean its various degrees of cohesion, hardness, flexibility, lustre, &c. The following are the general rules adopted for this purpose:—To obtain a deposit of bright hard crystals use a current of high intensity and small quantity; for a hard and rather brittle reguline deposit use high intensity and moderate quantity; for a dark gritty powder deposit use high intensity and large quantity; for an elastic and bright reguline deposit use moderate intensity and small quantity; for a soft, tough, and perfectly reguline deposit use moderate intensity and moderate quantity; for a soft dark powder deposit use moderate intensity and large quantity; for a soft sparkling deposit use low intensity and small quantity; for a tough reguline deposit use low intensity and moderate quantity; and for a plentiful soft black powder deposit use low intensity and large quantity. All these conditions of the current have reference to the amount of receiving surface, and are supposed to be acting upon a liquid which is capable of yielding all these different kinds of deposit, such as aqueous sulphate of copper, copper being a metal capable of existing in all these states of aggregation; some metals, such as bismuth and antimony, are not so, they have never been deposited either flexible or tough, but only bright, hard, and crystalline, or else as a dark non-coherent powder; and some liquids can yield no other deposit than that of a dark powder, such for instance as the double carbonate of potash and antimony, or the solution of bichloride of platinum in acidulated water.

53. If we have a good liquid, and are producing a good reguline deposit with a one pair battery, and with electrodes the same size as the battery plates, and we wish to change the deposit to a crystalline one, we must put on several more pairs of battery, and immerse them (or the zinc of one of them will be sufficient) a very much less distance in the liquid; we may in addition, if convenient, raise the dissolving plate nearly out of the liquid; by these means we increase the intensity of the current without increasing its quantity, and thus obtain a harder, brighter, and more crystalline deposit; the reason for raising the plates more out of the liquid is that the increased intensity obtained by the additional pairs would force an increased quantity of current through the liquid, and we raise the plates to keep the quantity down to its original amount, or even to somewhat decrease it.

54. Then, supposing we wish to alter this into a gritty dark powder deposit, we must immerse all the plates much deeper in the liquid; and to change it into a soft black powder deposit we must take off all the pairs except one, and immerse that one at least ten times as deep as it was with the crystalline deposit into its liquid, we should also put a very large dissolving plate in the depositing vessel, one very much larger than the receiving article; by these means we should greatly increase the quantity and decrease the intensity of the current, and obtain the desired result.

55. As all these results have a reference to the size of the receiving article, we may produce nearly all of them simply by altering the amount of immersed receiving surface; the same quantity and intensity which would produce a reguline deposit with an article of moderate size, would give a black powder deposit with a much smaller article, and a crystalline deposit with a very much

larger one; small articles will only bear a small quantity of current for a reguline deposit, and large ones a large quantity; the smaller the article the greater is the tendency to a black powder deposit, and the larger the article the greater is the tendency to a crystalline one; the black powder deposit is one extreme, and the crystalline deposit the opposite extreme.

56. To make a deposit spread rapidly over an inferiorly conducting surface, we must put on considerable intensity, at the same time keeping down the quantity in order to preserve a reguline deposit; after that, to make it thicken rapidly without driving it too much unto the edges and prominent parts, or over the non-conducting portions, we must maintain the quantity of current up to as much as the article will bear; this will vary with different liquids and under different circumstances, and we must employ with it a very moderate intensity, otherwise the deposit will be very granular and brittle; the action of intensity in causing the rapid spread of deposit, appears to consist in conferring upon the particles of deposited metal the power of forming themselves into separate warty nodules or into crystals, each of which quickly becomes larger, and appears to powerfully repel its neighbour, and thus to cause a rapid spread of the metal; such a deposit when continued to a considerable thickness is exceedingly hard, especially in cold weather, but at the same time possesses but little cohesion, and breaks up readily on bending into a number of distinct nodules, which are like warty excrescences with rounded edges, when the quantity of the current is moderate; and are more or less perfect crystals, with edges sometimes beautifully defined, when the quantity of the current is very small and the operation extends over a long period of time in cold weather. Under the influence of high intensity or a long period of time, with upwards of 100 pairs of Smee's batteries, I have seen a tough deposit of zinc spread over several square inches of clear non-conducting sheet gutta percha; and I have repeatedly observed in depositing copper with rather high intensity, three pairs of Smee's battery, and moderate quantity, upon blackleaded gutta percha medallions, that where there was a plain *sunk* boundary line round near the edge, the deposit appeared to be powerfully repelled, and would remain quite thin there, whilst on each side of the line it was many times the thickness, and all round on the outside edge, accumulated to waste in large warty masses, containing oftentimes as much metal as the whole of the medallion besides.

57. All metal articles to be deposited upon, require to be cleaned and otherwise prepared before they are fit to receive a deposit, and those which are to be plated with silver, or which are to have a definite weight of some other metal deposited upon them, are weighed, and their weight noted down before they undergo the preparatory process of cleaning; this preparation of cleaning, &c., differs according to the nature of the article, and according to whether the deposit is required to adhere firmly to it, or to be taken off when formed.

(*To be continued.*)

THE CINCHONA BARKS,

AND THE MORE IMPORTANT QUESTIONS WHICH, IN THE PRESENT STATE OF SCIENCE AND COMMERCE, RELATE TO THEM.

BY MM. DELONDRE AND BOUCHARDAT.

(*Continued from page* 165.)

The authors did not consider it necessary, in their researches through the literature of the barks, to go back beyond the year 1792, because it was only at that period that the *Quinologia* of Ruiz threw some light upon the history of this valuable drug, whose virtues had already been demonstrated for more than a century and a half, although its origin still remained obscure, notwithstanding the work of Vahl published at Copenhagen in 1790, and translated into English by Lambert in 1797.

Ruiz, in his introduction, says, "With the assistance of information communicated to Linnæus by our distinguished botanist and naturalist Don José Celestino Mutis,

as the result of his numerous researches in the province of Santa-Fé during thirty years, we may hope for excellent observations respecting the real tree which yields cinchona bark, and for the history of several varieties.*

"I have in my possession an authentic manuscript by Dr. Mutis, which contains, among other things, a résumé of the virtues of cinchona barks—orange, red, yellow, and white. We may indeed anticipate much information from the publication of so learned a physician and botanist."†

In the *Anales de Historia Natural* for 1800, is the following passage relating to the memoir published by Zéa, in which, while he described the labours of Mutis, whose pupil and collaborator he was, he announced the superiority of the barks of New Granada over those discovered by Ruiz :—

"The Quinology of Bogota was always the favourite study of Mutis; he said that he had devoted thirty-seven years of his life to observations on this subject. The work is in two parts, the first botanical, in which he gives descriptions, accompanied by superb plates, of the *seven* species of bark, together with different varieties. . . The second part is wholly medical, and it shows that up to that time the administration of bark had been left to charlatans and prescribed upon chance."‡

MM. Delondre and Bouchardat attach great importance to these quotations and to those which follow, as evidence that the collection of *four* species made known by Ruiz in 1792, had been increased to *seven* in 1800, and because the above passage tends to prove the attention which Mutis gave to the determination of the particular virtues of each new species.

It must be remembered that from this time Ruiz and Pavon, in the supplement to the *Quinologia*, published at Madrid in 1801, directed their attacks against the pupil, but they could not avoid rendering justice to his master, as Ruiz had done in 1792.

"Other persons who have been at Santa-Fé are of the same opinion as to the importance of the collection of Dr. Mutis ; but they add that it would be unfortunate if that botanist did not himself publish his work, because, on passing through the hands of others, there might be danger of a repetition of the confusion made by Zéa between the four barks of Mutis with those of Loxa and Peru."§

However deplorable may be the acrimony with which each of the naturalists of these two expeditions have endeavoured to maintain the pre-eminence of their discoveries, we are compelled to follow them in their quarrels in order to bring back the question to the proper point of view.

Ruiz and Pavon, the chiefs of the scientific expedition to Peru, were acquainted only with the barks of Loxa and of the forests of Huanuco to the north of Lima, because they never went beyond that part of the South American continent ; and Zéa, the pupil and collaborator of Mutis, who wrote after his master's papers, was not acquainted with the barks of Peru ; and this conflict is much to be regretted, because by a comparison of the leaves and barks the botanists of the two expeditions might have avoided this misunderstanding. As to the efficacy of the barks, the analyses prove now that Mutis had good reason for affirming that the barks of New

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* *Quinologia ó tratado del arbol de la quina, por don Hipolito Ruiz.* Madrid, 1792.

Prologo . . . Con el auxilio de las noticias comunicadas á Linneo, por nuestro insigne botanico y naturalista Don José Celestino Mutis, cuyas esmeradas, y dilatadas tareas en el reino de Santa-Fé, por espacio de cerca treinte anos, debemos prometernos excelentes observaciones, sobre el verdadero arbol de la quina, y la historia de algunos especies de quinas.

† . . . La Alegado á mis manos tierca manuscrita instruccion, del mancionado Doctor Mutis. . . . Comprende la citada instruccion, entre otras causas, un resumen de las virtudes de las especies de quinas, anaranjada, roxa, amarilla, y blanca. . . . Que luces no podemos prometernos de la publicacion de la *Quinologia de tan sabio medico y botanico?*

‡ *Anales de Historia Natural*, Madrid, 1800.

. . . La quinologia de Bogota ha sido siempre la obrita predilecta de Mutis, y en la que dice haber empleado treinte y siete anos de observaciones. Contiene dos partes, la primera botanica, en que da las descripciones, y soberbias estampas de *siete especies* de cinchona, con unas quantas variedades.

. . . La segunda parte estada medica, en ella manifiesta, que la applicacion de la quina ha sido hasta el dia, empirica y aventurada.

§ Convienen otras personas, que han estado en Santa-Fé, en que es grande la colleccion del Doctor Mutis, veró anaden que sera lastima, que este botanico no publique *el mismo* su obra, porque en otras manos, es de temer se repita la confusion que ha hecho el Senor Zea de las quatros quinas de su maëstro, con las de Loxa, y demas Peruvianas.

Granada excelled those which had been preferred at the first, and which were derived from the forests of Loxa.

Zéa says, in his memoir, "There are *seven true species* discovered by Mutis, besides several other varieties which are officinal," &c. &c.*

Ruiz and Pavon reply: "We are compelled, in defence of our work, to refute the allegations of M. Zéa, and for the public good we are obliged to warn the public that the cinchona barks of Santa-Fé are derived from species quite different from those of Loxa and of Peru, which are recognized to be excellent and superior for medical use. . . . . The first cinchona of the *Quinologia* is recognized by all the *cascarilleros* who collect barks in the province of Huanuco as the best species, and the one most esteemed in medicine and commerce. . . . . Moreover, it seems to us impossible that the northern part of America could produce cinchona barks of good quality like those of Peru."†

The reasons advanced by Ruiz and Pavon for the preference of Loxa and Huanuco barks over those of New Granada rested upon the experience of 160 years, and it is principally those barks which are excluded at the present day, not only because they are less rich in alkaloids, but because they contain cinchonine.

MM. Humboldt and Bonpland, who successively traversed the forests of Huanuco, Loxa, and Quito, and subsequently enjoyed the hospitality of Mutis at Santa-Fé, have alone been able to institute a comparison, and to do justice to each discovery; and it may be seen with what enthusiasm M. Humboldt expresses himself in his biography of Mutis.

Here is the conclusion at which Ruiz and Pavon arrive: "Lastly, it is indispensable to combine all the barks of Santa-Fé and of Loxa, in order that by comparative examination a complete classification may be established, and an exact distinction of all the species which are found in commerce, and that this should be conducted with a knowledge founded upon medical experiences and observations, in order that the species may be arranged according to the degree of efficacy found in each."‡

More than fifty years MM. Delondre and Bouchardat state that they were influenced by the same ideas, and express their astonishment that Ruiz and Pavon have not carried out their comparative examination. Besides the certainty of the therapeutic value of each bark, there is the collection of all the leaves of the cinchonas of New Granada collected in different parts of the mountains, and which appear to the authors to resemble the leaves which they examined in the forests of Santa Anna, and those obtained from their first expedition to Bolivia. This collection, presented to them by Don Rafaël Duque Uribe, is to be offered to the "Faculté de Médecine," together with specimens of all the barks which the authors have described.

After Lambert had published, in 1816, his researches into the botany, chemistry, and pharmacy of cinchona barks, he completed his work by a more extended article in the *Dictionnaire des Sciences Médicales* in 1820, in which are collected the opinions of all the authors who had treated of cinchona bark. The first passages of this remarkable work are well worth quoting.

"This drug, the most precious of all those which possess healing virtues, is one of the greatest acquisitions made by man from the vegetable kingdom. The treasures of Peru, which the Spaniards have laboured to extract from the earth, cannot, in point of utility, be compared with the cinchonas which are produced there, and which for a long time they regarded with disdain or indifference. . . . . There

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* . . . Siete son las especies descubiertas por el Senor Mutis, con masquantas variedades de las oficinales, etc., etc.

† . . . Nos es forzoso, en defensa de nuestra obra, de rebatir las impugnaciones del Senor Zea, y por el bien de la humanidad, estamos obligados a manifestar al publico que las quinas de Santa-Fé, son especies muy diversas de las de Loxa, y demas Peruvianas admitidas, como finas, y superiores en el uso medico. . . . La primera quina de la quinologia, es reputada por los cascarilleros de Loxa, que pasaron á Huanuco, por la especie superior, y de mas estimacion en el comercio y en la medicina. . . . Tampore nos parece impossible que pueden criarse en la America septentrional, las exquisitas Peruvianas.

‡ Finalmente, es indispensable hacer una reunion de todos los materiales de las quinas de Santa-Fé, de las de Loxa, y de las demas Peruvianas, paraque, de su examen comparativo, resulta y se establezca un conocimiento completo, y distincion exacta de todas las especies, que giran en el comercio, y se proceda con conocimiento de causa, á los experimentos y observaciones medicas, á fin de colocar par orden, las especies, segun las virtudes y eficacia que se descubren en cada una.

is no epithet that may not with justice be applied to them when employed by experienced men and in a scientific manner. It is possible that substitutes may be found in our own country for opium, ipecacuhana, senna, musk, &c. &c. But we are still ignorant of any drug that would replace cinchona bark, which, with its remarkable properties, rescue with certainty from the arms of death men devoured by a pernicious fever, which demonstrates most forcibly the resources and capability of the healing art, and which more successfully refutes its unjust detractors."

All the authors who have written upon the history of quinine up to the present day, and even Walckenaër in his *Vie de La Fontaine*, in speaking of the poem on cinchona, have repeated with more or less detail the account given by Ruiz of the discovery of cinchona, which is as follows :—

"It is probable that the Indians of the province of Loxa were acquainted with the virtues of the cinchona, and employed as a remedy for intermittent fevers many years prior to the conquest of Peru by the Spaniards.

"During my stay in Peru, I have frequently heard persons worthy of credence narrate the tradition that, in the year 1636, an Indian of the province of Loxa made known the virtues of the cinchona to a corregidor who was suffering from intermittent fever. The corregidor, desirous of recovery, requested some of the bark from the Indian, and the mode of administering it, which was in the form of an aqueous infusion ; he followed his directions, in a few days recovered from the fever, and by continuing the use of the drug, finally became perfectly well. The same persons assured me that in the year 1638, the corregidor having been told that the wife of the viceroy of Peru was suffering from fever, wrote to the viceroy, the Comte de Chincon, and sent him some of the bark, describing its excellent virtues, adding that he had no doubt that it would speedily remove the fever. The viceroy being persuaded that no one was better qualified to administer the medicine than the corregidor, sent for him to Lima, and requested him to try the effect of it upon the fever patients in the hospital before giving it to his wife. The corregidor experimented in the presence of the medical men, and in a few days all the patients who had been subjected to the treatment recovered from the fever. After these proofs of its virtue, the countess took the bark, and in a few days was likewise completely restored to health, after having been ill for six months.

". . . . The Comtesse de Chincon, in gratitude for her recovery, distributed the remedy gratuitously, which long retained the name of "*De poudre de la Comtesse.*" Subsequently it was called "*Poudre des Jésuites*," because it was to them that the Countess entrusted a certain quantity before leaving Lima, in 1646, in order that they might extend its use."

Almost up to the present time cinchona bark has been known under the synonym of Jesuits' bark. It was in compliment to the Comtesse Chincon that Linnæus, in his botanical classification, called the tree which yielded this precious bark *Cascarilla cinchona*.

". . . . The number of authors who have written upon the tree which yields cinchona bark is very considerable, but some of them only known—as La Condamine in 1837; Joseph de Jussieu in 1839 ; Santestevan in 1651; Mutis in 1760 to 1801; Renquifo in 1772; Ruiz in 1792; Zéa in 1800; Pavon in 1801; Tafalla in 1802 to 1808: Humboldt and Bonpland in 1807; Bergen in 1822 ; Weddell in 1847, who have seen this tree in South America; the other authors have only examined dry specimens.

Humboldt is without doubt the author who has most contributed to the knowledge of the history and botany of this tree, in his two memoirs published on the cinchona forests. This naturalist resided for four years in South America, and travelled for a long time in the countries where the cinchonas are indigenous. He saw them north of the Equator, between Honda and Santa-Fé, in Bogota, south of the equinoctial line, in the province of Loxa, in that of Jaën de Bracamoros, &c., and during the time that he stayed with Mutis, the whole of the botanical collections of the latter were at his disposal. Many of the details on this subject were communicated to him at Guayaquil by Tafalla; at Loxa, by Don Vicente Olmedo, Inspector Royal of the cinchona forests; and in Spain, by the editors of the *Flore du Pérou*, &c. &c.

The cinchona bark most famed for its febrifuge qualities was known in 1638 under the name of Cinchona d'Uritusinga. Mutis and Zéa believed that their orange bark *C. lancifolia* was identical with the Cinchona d'Uritusinga, while on the other hand Ruiz and Pavon believed it to be the same as their *C. nitida*. The discussion

thus raised between these botanists continued for a long time, but none of them were able to decide the question as it has been since by Humboldt and Bonpland, who proved that Cinchona d'Uritusinga, to which they gave the name of *C. Condaminea*, is neither the orange bark of Mutis, nor any one of the species described by Ruiz and Pavon, but a particular species which was reserved for the royal family at Madrid.

Laubert, who has furnished us with the preceding details, found in this species of bark the crystalline substance which Gomez designated *cinchonine*, which Pelletier and Caventou recognized as an organic alkali, and which they obtained in combination with sulphuric acid. Such was the first step towards the discovery of the other organic base, quinine and its compound with sulphuric acid, which has given so great a value to the calisaya bark from which it was extracted.

It was in 1789 that he spoke for the first time of this calisaya bark. Vitet, a physician at Lyons, made known the importance of this bark therapeutically. In 1816 Laubert made this curious remark: "The calisaya bark is much estimated in Spain, and the most experienced practitioners have assured me that the mixture of one part of this bark with three or four of Loxa bark is very efficacious in fever."

So that at that period the good results to be obtained from the use of a mixture of barks containing quinine, with those containing cinchonine, had already been practically demonstrated.

In 1820 Laubert also said, "The yellow bark, well known under the name of *Calisaya*, is now most employed by pharmacists; three pounds of it are sold for one of grey bark. The price alone explains this difference in the sale; for *the former costs three francs*, while *the other is sold for twelve*. It is to be regretted that the grey bark is so little used, for *it is certainly more efficacious in the treatment of severe intermittent fevers*."

(*To be continued.*)

THE CHEMICAL METHODS OF DETECTING BLOOD STAINS.

BY H. ZOLLIKOFER.

Although it might appear that the microscope affords the most sensitive means of detecting blood stains, and that chemical methods are in this respect inferior to it, the applicability of either one or other is in reality but limited, and in many instances both are equally inapplicable.

The microscope perhaps affords the safest indications in the case of fresh blood, or of blood dried without admixture; but when it is requisite to obtain evidence of blood-spots that have dried upon, or mixed with other substances, such as iron-rust, earth, &c., I have been unable to separate the blood corpuscles in such a state that I could venture to pronounce a decided opinion upon the presence and absence of blood.

On the other hand, all those chemical methods which consist in the detection of albumen—a constituent of many organic liquids—are inapplicable. So likewise appears to me the cyanogen test, which has recently been so often recommended, and which consists in the production, first, of cyanide of potassium, by treating the suspected substance with melted potassium, and then of ferrocyanide and Prussian blue. This method in reality does no more than furnish evidence of the presence of nitrogen in the substance examined, and does not at all justify the inference that blood is present.

When again, by digestion with alcohol containing sulphuric acid, a more or less red solution has been obtained, which, by evaporation to dryness and ignition affords a residue containing oxide of iron, this fact cannot be taken as evidence of the presence of blood, except there is a certainty that the substance examined contains no iron, and there are few instances in which this method would be applicable.

I have recently had occasion to experience how little attention is paid in the search for minute traces of blood for purposes of forensic chemistry, to the conditions and circumstances which relate to the objects examined, and the result was, the adoption of the following method of examination :—

The point to be ascertained was, whether certain reddish-brown spots upon hatchets, axes, clothing, wood, earth, &c., were in part owing to the presence of

blood. The nature of these spots rendered it indispensable that the method adopted should be extremely delicate, in order that trustworthy results might be obtained. This was possible only by adopting as a starting-point the method lately proposed by H. Rose.

My attention was chiefly directed to two constituents of blood—albumen and hæmatin—and more particularly to the latter substance, which is so characteristic of blood, that its detection admits of a positive opinion being formed as to the presence of blood. I believe that by means of a further, and I might say specific reaction of hæmatin, I have succeeded in rendering more generally applicable the method proposed by H. Rose, and certainly the only one that was at all available.

It will be best to illustrate the method by an example, and thus to point out the general mode of conducting both the preliminary experiments and the actual examination of the suspected objects.

I select the examination of iron rust stained with blood, and assume, under A, that the blood has been only a *short* time, that is, less than a month, in contact with the rust; under B, that they have been longer in contact.

A. The rust is carefully scraped off with a knife into a small porcelain capsule, digested for some time with cold or tepid water, and the liquid filtered. There will then be in solution albumen, the soluble salts of blood and hæmatin, which, even in very small quantity, communicates to water a reddish colour. This solution is further examined:—

1. *By heating to the boiling point*—when a dirty reddish coagulum or mere opalization is produced according to the amount of albumen and hæmatin. It is advisable first to neutralize the solution, which will probably be alkaline, with dilute acetic acid.

2. *Solution of the coagulum in hot caustic potash.*—The hæmatin dissolved in this manner renders the liquid dichromatic, appearing green by transmitted light, and red by reflected light.

3. *By addition of concentrated chlorine water in excess.*—To this solution, or to the original solution, white flocks—albumen with chlorhæmatin—are separated, after sufficient shaking, especially at the surface of the liquid.

The reaction of 2 is indicative of hæmatin alone, the others are indicative both of hæmatin and albumen. But when the quantity of blood is very small the dichromatic appearance may not be presented, although a sensible precipitate is produced by chlorine water. This latter reaction alone cannot be taken as indicative of blood, and in order to obtain indications of blood when its quantity is very small, and Rose's method leaves the result doubtful, I have had recourse to the following facts:—

a. Hæmatin is the only known organic substance that contains iron, its formula, according to Mulder, being $C_{44}H_{22}N_3O_6Fe$.

b. By the action of chlorine upon hæmatin suspended or dissolved in water, a white precipitate, *free from iron*—chlorhæmatin—is separated in flocks, while the iron is dissolved as chloride.

c. The most sensitive test for iron is probably sulphocyanide of potassium, and there is a possibility of detecting it by this means in the solution from *b*. The question then arises how far the dilution may be carried so as to obtain a perceptible reaction.

The experiments which I made to determine this point show, that the iron separated from hæmatin by chlorine may very easily be detected in the filtrate, and the sulphocyanide test is so delicate, that in the examination of an old blood stain upon wood, of only two square lines, a perceptible reddish-yellow colour was produced by sulphocyanide, although the reaction of the water solution with chlorine was a mere whitish turbity, and a flocculent precipitate did not appear until after some hours. Other similar experiments confirmed the delicacy of this reaction.

B. When the blood has been long in contact with rust, combination takes place, as Rose has pointed out, and the hæmatin becomes insoluble in water. In such instances the rust must be boiled with caustic potash, in order to obtain a solution of the hæmatin. A large excess must be avoided, because this would render the saturation with chlorine difficult.

In applying this test, it is, above all things, necessary to be certain that soluble iron salts are not present. Thus, in the examination of some brownish-red spots upon cotton a remarkably distinct reaction was observed with sulphocyanide of potassium, which bore no proportion to the previous reaction with chlorine, and I

was led to believe that this was owing to the presence of salts of iron with humic acid. To avoid error from this source, the water solution must always be tested for iron in the first instance, and when it is present two experiments must be made; one with a water solution to determine the presence of albumen and hæmatin by chlorine; the other with an alkaline solution, which would be free from the iron of such soluble salts, albumen, hæmatin, &c., would be separated by supersaturation with chlorine, and the iron separated from the hæmatin by this treatment tested for in the filtrate. Both reactions together would then afford a positive indication of blood.

Rose has shown that several organic substances prevent the precipitation of oxide of iron by alkalies, so that the question arises whether the detection of iron by the sulphocyanide test in the filtrate from an alkaline solution like the above after treatment with excess of chlorine, can be safely regarded as indicative of iron. Experiments that I have made with albumen show that this substance does not exercise this influence, but it must be admitted that an objection to the hæmatin test may be raised upon this ground.—*Annalen der Chemie und Pharmacie, Feb.*, 1855.

INFLUENCE OF HEAT UPON PALM-OIL.

Pohl has observed the melting-point of palm-oil obtained from different sources and of different ages. His results showed the same discrepancy as those of others.

Ure	117°.5 F.		
Payen	70°.6 to 84°.5	Pohl	A 94°.8 to 95°.2 F.
Pelouze and Boudet	70°.6		B 94°.1
Henry	84°.5		C 76°.5 to 76°.9
Grossman	99°.5		(oil kept ten years) 105°.8 to 106°.2

This difference he considers to be owing partly to the time the oil has been kept, and partly to the fact that the oils examined were derived from various species of palms, since the oil met with in commerce is obtained not only from the fruit of *avoira elæis*, but likewise from that of *areca oleracea*, *cocos nucifera*, and *c. butyracea*.

In order to ascertain the effect of long heating upon palm-oil, the sample A was heated for ten hours in a shallow porcelain capsule, to about 190° or 199° F. The colour appeared much lighter after this treatment, the surface of the cold fat was granular, the smell rancid, and the melting-point 99.5 F.

Palm-oil heated to 212° F. for ten minutes with good animal charcoal, presented a somewhat lighter colour, but could not be decolourized in this way.

The fat purified by filtration was then exposed to a higher temperature; at 239° F. it appeared to boil, probably in consequence of the evaporation of a small quantity of water which it might contain; this ceased at 268°.6 F. At 294° F. very acid, pungent, white vapours began to be formed (exhibiting no resemblance in odour to acroleine); these became very troublesome at 374° F., although the weight of the substance thus volatilized was inconsiderable. At 474°.8 F. the fat did not boil. It then had a dark-brown appearance; but a portion of it, poured into cold water to cool it rapidly, no longer showed any trace of a yellowish-red colour. It was, indeed, bleached, and although still somewhat brownish, was quite as white as the best palm-oil bleached according to Payen's method. It had the consistence of hog's lard, an empyreumatic odour, the peculiar odour of palm-oil having entirely disappeared, and a waxlike taste. The portion of the heated palm-oil which had not been poured into water was still fluid after standing two hours at 72°.5 F., and the separation of a solid body did not commence for three hours. After nineteen hours about one-third was still liquid, and a brownish-red oil flowed from the fatty mass, amounting to about one twenty-fifth of the whole. In the course of sixty hours even this oil solidified into a brownish-white mass.

The bleaching of palm-oil therefore takes place under the above circumstances in a short time, as completely as in ten or twelve hours by Payen's process.

The author then endeavoured to ascertain whether, as is generally supposed, the access of light and air was necessary for the bleaching; and to settle this point, palm-oil was heated in a covered vessel and in the dark to 475° F., and left to cool after exposure to this temperature for ten minutes. The palm-oil was, as before, completely bleached. At this high temperature, therefore, the destruction of the

yellowish-red colouring matter is not effected either by the action of light, or by oxidation.

To find the lowest temperature at which this rapid bleaching can be advantageously effected, palm-oil was heated in twenty-four minutes to 410° F., and kept at this temperature for six minutes; on cooling, it was certainly lighter in colour, but not perfectly bleached. When heated to 419° F., and kept at this temperature for fifteen minutes, the palm-oil was lighter in colour than in the preceding instance, but still not sufficiently bleached. When kept at 469°.4 F. for fifteen minutes, it appeared completely decolourized. Lastly, when palm-oil was heated in twelve minutes to 464° F., a sample drawn at once still retained a yellow colour; but in five minutes it was colourless. From the above experiments it appears that when palm-oil is quickly heated to 464° F., and kept for a few minutes at this temperature, it is perfectly bleached without access of air or light. The author has not only tried this mode of bleaching on a small scale, but it has been carried out for three years in a manufactory. The heating of the palm-oil is effected as rapidly as possible in cast-iron pans; it is kept for ten minutes at a temperature of 464° F., and the bleaching is then completed. Ten or twelve hundredweight of palm-oil may be conveniently heated in one pan, which must however only be two-thirds filled, as the palm-oil expands greatly by the heat. It must be covered with a well-fitted cover, which prevents inconvenience from the above-mentioned acid fumes. When operated upon on a large scale, the palm-oil acquires a purer white colour than when treated in small quantities; and yields a very fine, solid, white soap. The empyreumatic odour which appears immediately after the bleaching disappears after some long time, and even the original violet-like odour of the palm-oil returns. The soap prepared from it has also a pleasant, violet-like odour, as the empyreumatic smell entirely disappears during saponification. Palm-oil which is much contaminated with vegetable matters should be melted at a lower temperature before bleaching, so as to allow the impurities to settle. The best samples of palm-oil never contain more than 0.3 to 1.0 per cent. of such impurities.

When palm-oil is heated to 572° F. with access of air, it begins to boil, and a strong odour of acroleine is perceptible. Distillation, carried on at 572°-592° F., proceeds very slowly, as the vapours formed are heavy and readily condensable; but when steam is passed into the fat, heated to 572° F., the distillation takes place very quickly. At the commencement of boiling the palm-oil froths much, and easily passes over into the receiver; but in a few minutes this frothing ceases, and the distillation goes on without further disturbance. The author has effected the distillation of quantities of from 30 to 50 lbs. of palm-oil. When the fat is in contact with atmospheric air at the point of distillation, acroleine is formed, and passes over with the mixture of fatty acids. The action of this substance upon the lachrymal glands and the organs of smell and respiration is terrible. The same odour is acquired under these circumstances by the products of distillation, and they cannot be freed from it even by boiling with water. But if care is taken that, when the palm oil has reached the temperature of 572° F., all atmospheric air shall have been expelled from the apparatus by steam, not the smallest odour of acroleine makes its appearance during the distillation, which takes place without any trouble to the workman. At the end of the operation a blackish-brown liquid remains in the distilling vessel, which on cooling sets into a tough and elastic mass, and may be employed as an ingredient in the production of common soap, in the preparation of engine-grease, &c.

From good crude palm-oil purified by fusion, from 68 to 74.6 per cent. of fatty acids were obtained by distillation. The colour and consistence of the distillate is not the same at different periods of the operation. At first from 25 to 30 per cent. of perfectly colourless fatty acids come over rapidly; these, when solidified, form a solid mass; after this the products of distillation pass more slowly, always becoming more greasy on cooling, and more and more of a brownish colour. The empyreumatic odour of the fatty acids is lost in time, giving place to a waxy odour. When the colourless product of distillation is kept in the fused state for a considerable time, even at a low temperature, or repeatedly fused, it gradually acquires a darker colour, and at the same time becomes softer.

Determination of the melting-points of the fatty acids obtained by distillation gave the following results:—

First Experiment.—The first half of the distilled fatty acids, which was of a slightly yellowish-white colour, was—

I. Transparent at 105° F., and melted at 117°.5 F.

II. Transparent at 104° F., and melted at 117°.5 F.

The second half of the distillate, of a strong brownish-white colour, was—

I. Transparent at 101°.3 F., melted at 110°.7 F.

II. Transparent at 101°.7 F., melted at 110°.9 F.

The second half of the distillate, after complete cold pressure, fusion with water to which 0.25 per cent. of oxalic acid had been added, and fining with white of egg, had a slightly brownish-white colour; it was—

I. Transparent at 107°.4 F., fused at 121°.5 F.

II. Transparent at 107°.8 F., fused at 120°.7 F.

II. is a mere repetition of the determination of the melting-point of the mass serving for the first experiment (I.).

Second Experiment.—The product of distillation was collected in five separate portions. The per-centage as compared with the entire distillate, was respectively,—

	1	2	3	4	5
Per-centage ...	21	28	17	9	25

The determination of the melting-points gave the following results:—

1.	Transparent at	111°.9 F.....	Melted at	124°.5 F.
2.	"	103°.1 F.....	"	114°.4 F.
3.	"	103°.1 F.....	"	113°.7 F.
4.	"	103°.1 F.....	"	111°.9 F.
5.	"	99°.1 F.....	"	109°.0 F.

The coloured fatty acids obtained by distillation may easily be rendered colourless by recrystallization from alcohol. The author found the melting-points of several portions of such purified fatty acids to be—

1st crystallization	137°.4 F.
2nd crystallization.....	140°.7 F.
3rd crystallization	138°.9 F.
4th crystallization	138°.5 F.

For comparison with the above determinations of the melting-points of the products of distillation of palm-oil, the author gives the following results obtained by him with fatty acids obtained by the process of Masse and Tribouillet, by treating palm-oil with sulphuric acid, and subsequent distillation with super-heated steam.

The distillate of palm-oil, obtained in the year 1851 directly from the manufactory at Neuilly, and of a pure white colour, was—

I. Transparent at 98°.5 F., melted at 106°.9 F.

II. Transparent at 94°.1 F., melted at 106°.5 F.

The second portion of the distillate, obtained from the same manufactory, but pressed and of a dazzling white colour—

I. Became transparent at 106°.7 F., melted at 123°.1 F.

II. Became transparent at 108°.5 F., melted at 120°.9 F.

III. Became transparent at 108°.5 F., melted at 120°.5 F. The second and third determinations were repetitions of the first with the same mass of fatty acids.

Palm-oil distillate, from the close of the operation, also from Neuilly, crystallized and pressed, also of a dazzling white colour—

I. Became transparent at 109°.2 F., melted at 120°.4 F.

II. Became transparent at 109°.4 F., melted at 120°.4 F.

After keeping for two years exposed to the light, the substances, which were originally pure white, acquired a somewhat brownish tinge.

Fatty acids, prepared in Vienna according to Tribouillet's method, as employed in August, 1851, in the production of the Belvidere candles, and of a brownish-white colour, became transparent at 103°.1 F., and melted at 118°.9 F.

Fatty acids, afterwards prepared in Vienna, were pure white, like those produced in France, and the melting-points of both were much the same.—*Sitzungsber. der Akad. der Wiss. zu Wien*, xii., p. 80.

PRODUCTS OF STEARINE BY DISTILLATION.

Some difference of opinion exists as to the influence of heat upon stearic acid, for while it was stated by Chevreul that stearic acid may be distilled without alteration, and that only a small proportion is decomposed, yielding, among other products, chiefly carbonic acid, water, and hydrocarbon, Redenbacher inferred, from his experiments, that stearic acid is decomposed by heat, yielding margaric acid, margarone, carbonic acid, water, and hydrocarbon. More recently Laurent and Gerhardt stated that, under favourable conditions, stearic acid may be distilled without experiencing any decomposition; and this observation, together with the evidence that has been obtained against the chemical individuality of margaric acid, has induced Heintz * to repeat Redenbacher's experiments.

The distillation was conducted in an atmosphere of hydrogen, and the distillate separated into three portions: the first, solid at the ordinary temperature, with a boiling-point above 302° F.; the second, which is separable as a liquid at 302° F.; the third gaseous. Distinct indications of carbonic acid were obtained in this gaseous product.

The liquid product consisted of an aqueous layer, which contained, besides water, acetic acid, with a small amount of a more highly carbonized member of the fat-acid series, probably butyric acid, of which, indeed, the liquid smelt; and an oily layer, which gave on analysis results corresponding with the formula $C^{70}\ H^{70}\ O$, and is consequently to be regarded as a mixture of several substances, very probably members of the hydrocarbon series ($C^m\ H^m$), and of the ketone series ($C^n\ H^n\ O$).

The solid distillate was separable into a fat acid, melting at 135°.3 F., being almost pure stearic acid; neutral substances—one, melting at 189°.5 F., very sparingly soluble in cold ether, another, also solid, more soluble and melting at a lower temperature—and some oily liquids.

None of these substances were obtained pure in sufficient quantity for elementary analysis. The liquid product submitted to fractional distillation was separated, at constantly increasing temperatures, into portions, which successively deposited a larger proportion of solid substance at a low temperature.

The gaseous portion of the distillate was almost wholly hydrocarbon, containing only 0.8 or 0.9 per cent. of oxygen. It contained as many equivalents of carbon as of hydrogen, and might therefore be regarded as a mixture of members of the hydrocarbon series ($C^m\ H^m$), and of the ketone series ($C^n\ H^n\ O$).

The residue in the retort did not contain any considerable quantity of acid substance, but consisted chiefly of the same substances which had been found in the neutral portions of the distillate. It contained, however, so much of the substance, with a high melting point, as to admit of analysis, which showed that it was the substance obtained by Bussy ($C^{35}\ H^{35}\ O$).

From these results Heintz infers that stearic acid distils, for the most part unaltered, while a portion is decomposed in several different ways. This decomposition he considers to be in part such, that less carbonized members of the fat-acid series are formed, while hydrocarbon ($C^n\ H^n$) is separated, and in part such, that carbonic acid, water, and stearine ($C^{35}\ H^{35}\ O$) are formed. This latter substance is likewise partially decomposed by distillation into hydrocarbon and more volatile ketones.

These decompositions may be represented by the following equations:—

1. $C^{36}\ H^{36}\ O^4 = C^n\ H^n\ O^4 + C^{36-n}\ H^{36-n}$
2. $C^{36}\ H^{36}\ O^4 = CO^2 + HO + C^{35}\ H^{35}\ O$
3. $C^{36}\ H^{36}\ O^4 = C^m\ H^m\ O + C^{35-m}\ H^{35-m}$

THE LIEBIG TESTIMONIAL.

TO BARON LIEBIG.

London, July, 1854.

Sir,—Your retirement from the Chair of Chemistry in the University of Giessen has appeared to many in this country a fitting occasion for the public acknowledgment of your eminent scientific services. Accordingly a numerous body of your friends and admirers have united to present to you a Testimonial, commemorative of

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* *Monatsberichte der Akad. der Wissenschaften zu Berlin*, January, 1855.

their profound and unalterable regard. In the list of Subscribers hereto annexed, you will recognise, with those of your pupils and personal friends, the names of many other gentlemen eminent in science, in social position, and in the practical arts of life, who were anxious to join in this just tribute to your merit.

In presenting to you this Testimonial, the Subscribers desire to express their sense of the benefits which your genius and labours have conferred upon mankind, in adding to the world's stock of positive knowledge. These benefits are limited to no one people or time ; but it is felt that Englishmen may, with propriety, take the lead upon this occasion, as the impulse which you have given to chemical science has been experienced, especially in England. More students from this country than from any other land beyond the bounds of Germany have worked in the laboratory of Giessen, and have derived incalculable benefit from the instruction there imparted, and from the noble example there presented to them of an elevated philosophical and scientific life. In England, also, have the applications which you have made of chemical science to the cultivation of the soil been peculiarly appreciated and adopted. Your discoveries in practical agriculture have enriched the land, and with you originated the method of scientific inquiry which is here pursued on an extended scale by numerous investigators, and which is rapidly changing the features of the most ancient and important of human arts.

We earnestly hope that your life, which has been devoted to the highest aims to which man can aspire, may be prolonged to many years of happiness and honour.

Signed on behalf of the Subscribers,

THOMAS GRAHAM,
Chairman of the General Committee.

TO THE CHAIRMAN OF THE GENERAL COMMITTEE.

SIR,—The man of Science generally knows of no other reward for the time he has devoted to the discovery of truth, and to the investigation of the laws of Nature's powers, than the mental satisfaction which springs from the consciousness of having, to the best of his ability, contributed his part towards the advance of human happiness and human welfare; for toils like his, attended as they are with so many difficulties and sacrifices, and with such mental effort and fatigue, cannot be priced in the market or sold,—cannot be performed to order, or turned into money. If he has been fortunate enough to have gained by his successes the acknowledgment and esteem of his contemporaries, he has obtained the highest object of his ambition.

If I have laboured for the period of almost a human life, in promoting the progress of Chemistry, and in making its principles subservient and useful to other branches of knowledge, more especially to the industrial arts and to agriculture, I gratefully acknowledge that I have received in return all that a man could justly aim at. My satisfaction in this respect is not a little enhanced when I look back to the number of zealous and able men in whose education I have been enabled to assist, and who are now occupying, in various countries, a distinguished position in the front rank of science, and are, with splendid success, cultivating and extending her domain,—teaching ; diffusing, and successfully applying those principles of investigation which constitute the true foundations of scientific progress. It is with pride that I am able to add, that in these my former pupils, I have gained an equal number of warm friends, who, I am sure, look back with pleasure to the time when we combined our powers in one common aim and effort.

And now, in addition to all that a benevolent destiny had already granted me in measure above many, I receive from my friends in England, in this gift of friendship, in this testimonial of honour, a token and a proof of their recognition and approbation of my labours.

When I reflect that whatever of good a man accomplishes, flows from an inner impulse of which he is often but imperfectly conscious, and that a higher power has a part in all his labours of usefulness,—giving to them their life-germ and their capacity of growth,—I must own that, in receiving this noble Present, I am blessed far beyond my deserts.

I feel myself in the highest degree honoured, and most deeply touched by this substantial and permanent expression of the kind feelings of my friends in England. Convey to them all my best and warmest thanks. This Gift of Honour possesses for me inestimable value, and will remain a lasting memorial in my family.

DR. JUSTUS VON LIEBIG.

SECRET FORMULÆ.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The pages of the Journal, like the life of a pharmaceutist, are charged with a double duty—sometimes devoted to science, but not unfrequently to that which concerns the politics of the body; and, it may well be conceived that, in a period of most unmistakable transition there should be much of the nature of pharmaceutical ethics suggesting itself for consideration and arrangement. That pharmacy is in a state of transition none can doubt, when they see existing as new institutions — a Pharmaceutical Society based upon the principle of education, and armed with authority for enforcing it by compulsory examinations—and when they see that most gratifying indication of the progress already made, and its impression out of doors afforded by the privilege, now for the first time ours, of assisting in the compilation of the Pharmacopœia; and it can scarcely need more argument to show that this higher position which we have attained and that still higher one to which we aspire, entail responsibilities which were unknown to those who practised pharmacy in the gloom which preceded these happy innovations.

Without affecting to wrap ourselves in a mantle of scientific conceit, or to despise the more toilsome necessities of trade (as some hastily think is the inevitable consequence of cultivating scientific pursuits) we look forward to deserving the respect of the public on the score of solid professional qualifications, and we must expect to find that there is something to unlearn as well as much to learn. We cannot hope to invest our shops with the *prestige* which attaches to the pursuit of a liberal profession without casting off the empirical tricks of our fathers, as well as superadding a liberal and scientific education to their technical expertness. It is true that such a training will inevitably produce in the long run a tone of sentiment fatal to the perpetuation of anything secret or mysterious. The essence of education, and especially of scientific education, is diffusion and publicity, and by the time its influence is generally felt empiricism will have received its death-blow; but the emergency is pressing, the occasion is now at hand, and we must rather rely upon that spirit of "Excelsior" which the career of the Pharmaceutical Society has proved to be innate in its Members, especially the founders (be they honoured!), than upon any influence which the new régime can yet have spread abroad. The time is now favourable for testing the *esprit de corps* of the Pharmaceutists—the result will show how far they justify the respect implied in the invitation of the College of Physicians to share the labours of the new P. L. If they respond by a large-minded far-seeing comprehension of the importance of the present crisis—if they generously surrender considerations of petty and exclusive advantages, and freely place at the service of the committee such information and such private formulæ as their individual experience has collected, they will have done their share towards the advancement of pharmacy to its proper place, and will have shown that dignified professional liberality which they *must* exhibit before the world will concede to them the honour of professional standing. On the other hand, if from unworthy self-interested motives they withhold the information they might contribute, they damage the present and future prospects of the body—they sacrifice the excellence of the Pharmacopœia—and, as a probable result, retard the amalgamation of the codices of the three Colleges, and they must feel miserably conscious of their unfitness to form a branch of that noble profession whose pride it is to bring into the common stock the most valuable results of years of observation.

I would suggest, with a view to carrying out this object, that the Committee should address circular notes to the proprietors of any private formulæ which seem applicable for introduction into the P. L., inviting them to furnish the formulæ for their preparation. It is true that this may be asking them to sur-

render some pecuniary benefit, although this would doubtless be less than might at first appear; since the name which first got the market will generally hold it; but even admitting that loss would follow, are we to assume that no sacrifice would be made to such a worthy purpose? or, can there be any doubt of the necessity for the physician knowing accurately the nature of remedies which he is accustomed to prescribe? And some of these are still amongst the list of "secret preparations." I am, Sir, your obedient servant,

Clifton, April 11, 1855. R. W. Giles.

THE CHEMISTRY OF PRESCRIPTIONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A short time since the following prescription, written by an eminent Physician, was brought to me for preparation:—

Acid. Hydrocyanic. Scheele ʒss.
Potass Iodidi ʒss.
Sp. Æther. Nit. ℥j.
Tinct. Scillæ ʒiij.
Syr. Aurantii ℥j.
Aq. Destillatæ ℥ijs. ℿ.

This mixture, as prepared by me, was objected to as wrong in colour, it having been compounded in the first instance at one of the "Great Historic Houses" in town, and was red, whereas my mixture was nearly colourless. I at once saw the cause of the difference, and explained that the red colour was due to the decomposition of the iodide of potassium by the spirit of nitre which had become acid by keeping. Having some acid spirit of nitre in the house, I illustrated the point by again making the mixture, using the *acid* spirit of nitre instead of the neutral. The resulting product was pronounced to be exactly similar to that obtained at the shop before alluded to. My customer, a lady, listened politely and attentively to my explanation—as all ladies would—and left, as I supposed, favourably impressed with my care and accuracy in dispensing. But, unfortunately, I have not been favoured with any subsequent manifestations of confidence, and presume the "Great House" was able to give a better account of the red mixture than I had given of the almost colourless one. Thus, Sir, I lost my customer by dispensing a prescription with chemically pure ingredients. My object in calling attention to this matter, is to ask if it be possible to prepare spirit of nitre that shall not become acid? The foregoing statement will show that this is most desirable. I attribute the purity of my own to the circumstance of having only sufficient to last a limited period, and the impurity in the other case to inadvertence on this point.

If spirit of nitre be sent out by one of the first houses in the trade, so acid that it immediately decomposes a neutral salt, giving a new character to the combination, may we not suppose that such would frequently be the case in the ordinary run of shops? and if, as competent authorities inform us, spirit of nitre always becomes acid when kept any time, would it not be desirable for medical men in their prescriptions to bear this in mind, and assume the probability of an acid reaction, ordering at the same time an alkali, such as bicarbonate of potass, and thus prevent the possibility of such variations in the appearance and character of medicines prepared from the same prescription at different establishments?

I have ventured to call attention to this subject, not with the view of criminating others, but of suggesting a remedy. I am, Sir, yours respectfully,

Haverstock Hill, near the Toll-bar, April 21*st*, 1855. Tho. R. Collins.

THE ORDEAL BEAN OF OLD CALABAR.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having been for some time past anxious for information concerning the ordeal bean of Old Calabar, I read with very great pleasure Dr. Christison's valuable paper upon that subject in the last number of your Journal. The figures you added are admirably correct, and assisted me much in determining the identity of my own specimen.

In 1852 I received three of these curious seeds from Mr. Dawson, a shipowner and African merchant of Liverpool, who is always most ready to afford any assist-

ance in the cause of science which his position will permit. He obtained them from Old Calabar, under the name of *chop-nuts*, or ordeal beans, and from subsequent inquiries, I find the term *chop-nut* known to many masters of vessels trading to those parts.

I forwarded one to Sydenham for Dr. Latham to place in the hand of one of his ethnological illustrations ; another I sent to Mr. J. De C. Sowerby for the Museum of the Royal Botanic Society, but it was lost in the post ; the third I still have, and it agrees most closely with Dr. Christison's description and your very excellent figures.

I supposed from the first that it was the seed of a species of Mucuna (a genus closely allied to Dolichos) from its great resemblance to the seed of *M. urens*, from which it only differs in shape, and a remarkable depression of the *hilum ;* and I doubt not, when the plants flower, they will confirm this supposition.

I am, Sir, yours obediently,

THOS. C. ARCHER,

Lecturer on Botany at the Liverpool Royal Infirmary School of Medicine.

April 17, 1855.

MODE OF CONCENTRATION BY "ACCUMULATION PROCESS."

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

3, *Fleet Street, Liverpool, April* 13, 1855.

SIR,—Permit me to correct an error that occurs at page 453 of the current number of the *Pharmaceutical Journal.* At the discussion on concentrated infusions, which took place here on the 16th of February, I am reported to have "remarked that the plan I adopted in making them was by percolation with cold water, evaporation in a water-bath, and adding, when cold, the necessary quantity of spirit." Now this is an entire misconception of my meaning, for beyond the temperature of the laboratory, no heat whatever is employed in the process. My remarks were to the effect that I made concentrated infusions with cold water, by an accumulation process, similar to percolation, but so arranged that successive portions of fresh material can be added, as the highly charged liquor is displaced at one end of the apparatus, and the completely exhausted material removed from the other end, where the fresh solvent is added.

By this arrangement, which I may remark is the subject of a patent, a fluid extract can be obtained of almost any given strength, up to a gravity 1150 or 1200 without the application of heat, either for extracting or concentrating. The process is completely under the control of the operator, who, by slightly modifying it, according to the nature of the drug operated upon, is enabled to prepare an infusion precisely eight times the strength of the P. L., but free from all the starchy and other usually conceived inert matters.

Requesting the favour of your attention to this correction of an error which may otherwise cause misunderstanding,

I am, Sir, your obedient servant,

H. SUGDEN EVANS.

THE RESPONSIBILITY OF A DISPENSER OF PRESCRIPTIONS.

IN a case, of which we gave a condensed report in a recent number, the jury at a Coroner's inquest found a verdict of manslaughter against an Apprentice who had caused the death of a patient by a mistake in preparing a prescription. At the assizes held at Taunton the case was tried, and at the close of the evidence for the prosecution, Mr. Justice Earle said it was clear that a person was guilty of manslaughter who caused the death of another by an unlawful act, or by negligence, or want of skill, if that party undertook a duty without competent skill to perform that duty. Here no unlawful act was imputed, and there did not appear to be any negligent act. As far as appeared by the evidence, the prisoner was attending to his duties with the best care and skill he was possessed of, but had made a mistake, which most unhappily had proved a fatal one. No doubt if his employer had made that mistake, he would have been guilty of manslaughter, because he

professed skill as a Chemist. So, if the mistake had been made by the head dispenser, he would have been equally liable. But here it appeared that the mistake had been made by one who did not profess to be possessed of such skill, but was merely an apprentice, still learning his business ; and it would seem hard, if he was really doing his best, and made a mistake in so doing, he was to be held criminally responsible for that mistake. Under these circumstances, it was for the jury to say whether they wished the case to proceed further ; and if so, the prisoner's counsel would address them on his behalf. The jury at once acquitted the prisoner.

[This verdict must not be construed as a general indemnity to apprentices who "undertake a duty without competent skill to perform that duty."—Ed.]

BOOKS RECEIVED.

The Fibrous Plants of India fitted for Cordage, Clothing, and Paper, *with an Account of the Cultivation and Preparation of Flax, Hemp, and their Substitutes.* By J. Forbes Royle, M.D., F.R.S., &c. London: Smith, Elder, and Co., 65, Cornhill; Bombay: Smith, Taylor, and Co. 1855. 8vo, pp. 403.

Indian fibres having been suggested by the late Joseph Hume to the Society of Arts as a subject for inquiry, Dr. Royle was invited to take it up, and this interesting volume is the result. The subject, with reference to the materials for paper-making, was considered in a lecture, a report of which was published in the Journal of the Society of Arts, and also in this Journal (page 168 of the present volume).

The importation of fibres from India is of great commercial importance at the present time; and the increase, as shown in the following table, is most satisfactory:

Quantities of hemp imported into the United Kingdom:—

	1831.	1847.	1851.
From Russia.....	506,803	544,844	672,342
From British territories in the East Indies...	9,472	185,788	590,923

As a specimen of the manner in which the author treats the subject, we subjoin the following remarks on the different uses to which the same species of plants are applied in different countries. Dr. Royle observes (page 3):—

"If we extend our inquiries only to the plants which are cultivated by the natives of India, many will, no doubt, be surprised to find among them not only the true hemp, but also the true flax plant; and the more so when they learn that both are extensively cultivated, not in one, but in almost every part of the wide-spread territories of the Indian Empire. Still more curious is it that in few places are these plants valued for their fibres, which in Europe are almost the sole objects of attention. But in India the hemp plant is esteemed for the intoxicating properties secreted by its leaves, and the flax plant for the oil stored up within its seeds. The stems of both plants, which in Europe are valued for their fibres, are in India either thrown away or burnt. It will at once be concluded, as has more than once been the case, that countless loads of valuable fibre are thus yearly lost, either from the ignorance or the carelessness of the cultivators. Without denying that this may, in some degree at least, be the case, we may say in this, as in many other things, a little knowledge leads but to incorrect conclusions."

The Doctor also gives much valuable information as to the mode of cultivating flax and hemp in India, which is better suited for the secretion of the resin in one case, and of oil in the other, than for the production of strong and flexible fibre ; and suggests the adoption of the European system of cultivation, by which the quality of the fibre may be improved.

Quarterly Journal of Public Health, and Record of Epidemics and Hygiene ; *including the Transactions of the Epidemiological Society of London.* Edited by B. W. Richardson, M.D. Samuel Highley, Fleet Street. 1855. From the President and Council of the Edidemiological Society.

On the Lesions of the Vascular System, Diseases of the Rectum, and other Surgical Complaints ; *being Selections from the collected Edition of the Clinical Lectures of Baron Dupuyren.* Translated and Edited by F. le Gros Clark, Surgeon to and Lecturer on Surgical Anatomy at St. Thomas's Hospital. London: Printed for the Sydenham Society. 1854.

[The following, which will appear in the Annual Report, was accidentally omitted in the first sheet.—Ed.]

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

FINANCIAL STATEMENT.

From January 1st to December 31st, 1854.

RECEIPTS.

	£	s.	d.
Balance in Treasurer's Hands	555	10	1
19 Life Members' Fees	194	5	0
Benevolent Fund:			
Subscriptions 43 19 0			
Interest 125 19 7			
	169	18	7
Government Securities, Interest	210	16	10
398 Town Members' Subscriptions 417 18 0			
1943 Country Members 2040 3 0			
367 Associates 192 13 6			
360 Apprentices 189 0 0			
	2839	14	6
Fees:			
Pharmaceut. Chemists 47 5 0			
Assistants 69 6 0			
Apprentices 86 2 0			
	202	13	0
Arrears of Subscriptions	110	5	0
Lecture Fees	9	9	0
	£4292	12	0

EXPENDITURE

	£	s.	d
Life Members' Fund Investment	168	8	9
Benevolent Fund: Gratuities	45	0	0
Sundries	6	3	0
Repayments	11	0	0
House Expenses	32	1	6
Rent, Rates, and Taxes	344	5	10
Fixtures and Fittings	33	0	0
Postage	67	9	2
Stationery	12	0	7
Printing	56	2	6
Collector's Commission	41	11	11
Board of Examiners	33	12	0
Grant to Branch of Society in Scotland	61	4	2
Travelling Expenses, Country Members of Council	76	12	5
Salaries	525	0	0
Wages	179	4	0
Journals	944	7	6
Delivery of Journals	77	12	0
Library	25	12	10
Lectures	557	7	7
Museum	4	12	8
Advances to Messrs. Brace and Colt, Solicitors	667	10	0
Balance in Treasurer's hands	322	13	7
	£4292	12	0

TO CORRESPONDENTS.

F. P. B. (Plymouth).—*Aqua Fortis Duplex* is a weak nitric acid, containing a portion of nitrous acid. Sp. gr. generally about 1.220. According to Pereira, 1.36.

C. M. W. (Worcester),—*Black Ink.* See vol. xii., pp. 65 and 133. Probably that approved by the Paris Academy of Science (page 135) would meet the conditions required by our Correspondent.

A Member (Leamington), *Photos* (Settle).—*Photographic Collodion.* See page 144 of the present volume.

F. A. C. (Rochdale).—*Aqua Lavandulæ.* Vol. iv., pp. 99 and 243.

M. R. P. S. (Denbig).—"Gazogenes" answer the purpose intended.

An Anxious Inquirer (Norwich).—We are unable to give the recipes required. Our Correspondent should apply to the proprietors of the articles in question.

An Apprentice.—See our last number, page 433.

B. B. (Worcester).—Although well written, not suited for this Journal.

J. T. (Enfield).—We are obliged to our Correspondent for his suggestions:—1. The publication of elementary lectures in this Journal has been proposed before and fully considered. See vol. xii., p. 262. 2. We are at all times glad to receive communications from Members for publication, and the number of such communications is increasing considerably. 3. The other suggestion is in accordance with our regular practice, as each number contains "Leaders" on passing events relating to Pharmacy.

The Early Closing Association.—We have received a printed paper from Mr. Lilwall, containing a statement of the rise and progress of this Association.

Zeto (City).—*Vulcanized India Rubber.* See vol. xii., p. 32.

The paper by Dr. Theodor Martius will be inserted next month.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIV.—No. XII.—JUNE 1st, 1855.

THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

THE EXCHEQUER CHAMBER.—ARGUMENT.

The argument before the Court of Exchequer Chamber, in the case of Dickinson *versus* the Pharmaceutical Society, was commenced on Saturday, May 26th, before Chief Justice Jervis, Chief Baron Pollock, Justices Maule, Cresswell, and Crowder, and Barons Parke, Alderson, and Platt.

Sir Fitzroy Kelly, in opening the case, said the question to be decided was as to the right of three persons, Murdoch, Abraham, and Wright, to be on a certain register of Pharmaceutical Chemists. Before going into the clauses of the Act, on which he founded his objection to such registration, he would refer briefly to a judgment lately given in the Court of Queen's Bench, which it was his object to set aside by the present proceedings in error.

A learned judge inquired—Is that the judgment delivered by Lord Campbell on a case in which there was a dispute about the word pharmaceutical ?

The question being answered in the affirmative, and the pronunciation re-discussed, Sir F. Kelly quoted from the judgment to the effect that the case of Murdoch rested on different grounds from the other two cases, as he was elected a Member of the Society under a bye-law which was confirmed by the Act. So far as related to Murdoch, therefore, the error could not be maintained—at least he should not insist upon it for the present, although there were grounds on which he might call in question the decision even in this case; but he should pass on to the other two cases, Abraham and Wright, who were elected under bye-laws made after the passing of the Act. The learned Counsel went patiently and laboriously through the explanation of the four points of the Charter—that is to say, the four conditions of membership—prior to the passing of the Act; the new bye-laws; and the establishment for the first time of the register of Pharmaceutical Chemists, a class of persons (as he affirmed) "called into existence by the Act." He then repeated his version of the intention of the legislature, namely that only two classes of persons could be registered as Pharmaceutical Chemists, namely, the Members at the date of the Act (who had a vested interest), and persons examined after the passing of the Act.

Baron Alderson.—It is clear these two classes of persons may claim to be put on the register. Where does the Act say that no others are to be registered ?

Sir F. Kelly.—On reference to many other clauses, by implication, if not by direct enactment, it is clear that only two classes of persons are intended to be so registered. If it were otherwise, any person, even the learned Counsel in that Court, might be registered as Pharmaceutical Chemists, and the object of the register would be frustrated

Ch. Justice Jervis.—Was the Act carefully revised by any competent person ?

Sir F. Kelly.—I believe not, my Lord.

Ch. Justice Jervis.—It was framed by a compounder of medicine, was it not ?

Sir F. Kelly. —Yes, my Lord.

Ch. Justice Jervis.—And he pounded up the ingredients in a mortar ?

Sir F. Kelly.—Yes, my Lord ; the clauses do not follow one another very consecutively. I may state, however—although perhaps I ought not to go into that here—that the Bill, as originally drawn, contemplated more extended powers, but the Legislature would not pass it in that form.

The learned Counsel proceeded to explain the importance of the case. He said it was even more important to the public than to the parties concerned, as about 1200 persons were in the same position as those whose names he had mentioned ; having been placed on the register without, as he affirmed, possessing the qualification required by the Act.

Ch. Justice Jervis.—On whose behalf do you appear ?

Sir F. Kelly.—On behalf of the public.

Ch. Justice Jervis.—Does the public send you here ; you must act for somebody ?

Sir F. Kelly.—The party taking these proceedings is a Member of the Society, and naturally desirous of seeing that the register is properly kept.

Reverting to the judgment, the learned Counsel took exception to the inference, that the parties being Members, are *therefore* entitled to be registered as Pharmaceutical Chemists—observing that the learned judges had assumed this as a fact (or rather, to use a more respectful term) had so decided it, without arguing the question or showing any reason.

Justice Maule.—Were not all these points argued before the other Court ?

Sir F. Kelly.—Yes, my Lord, most fully; but, somehow, they failed to produce any impression—at least they were overlooked in the judgment.

The learned Counsel proceeded to explain the sections of the Act *seriatim.* He had arrived at the 10th section, and was insisting on the position that only the two classes above named could be placed on the register, when Justice Crowder turned to the 12th section, and observed that *no person, unless registered* as a *pharmaceutical chemist, could assume* the *name* of a *pharmaceutical chemist* or *Member* of the *Society.* If, therefore, his election as a Member was legal, he might be a Member and yet be prohibited from calling himself one, unless he was registered as a pharmaceutical chemist.

Sir F. Kelly replied that it was so; and this rather led him to infer that the legislature intended no person to be elected a Member until he had become qualified and registered as a Pharmaceutical Chemist.

After some conversation on this point, the Court being about to adjourn,

Mr. Bramwell enquired whether his learned friend conceded the point with regard to Membership or not ?

Sir F. Kelly said he might dispute the power to elect Members otherwise than in the manner recited in the Act, but he should not insist on that objection. His argument referred to the register of Pharmaceutical Chemists.

Mr. Bramwell.—In that case, my Lord, I will undertake to show that this is the most *ludicrous* case that ever was brought before a court of law.

Adjourned until Tuesday, May 29.

May 29. The argument had not terminated at the time of going to press.

THE LOCAL AND GENERAL INTERESTS OF THE PHARMACEUTICAL SOCIETY.

To those who take a comprehensive view of the objects, constitution, and progress of the Pharmaceutical Society, it must be obvious that its local and general interests are one and the same. Its proceedings emanate from the metropolis as a centre, and extend throughout the kingdom with more or less activity, according to the zeal and industry of the Members in the locality.

Whenever a disposition exists to advance the art and science of Pharmacy by means of lectures, scientific meetings, and other local proceedings, the general interest of the Society is concerned in the encouragement of such exertions on its behalf. Although it is impossible to extend to every country village those facilities of association which exist in a large town, and although no two places may possess precisely the same opportunities, yet any efforts on behalf of education and progress should be considered a movement in the right direction, and promoted accordingly.

The kind of assistance required will depend upon circumstances, in regard to which general rules can scarcely be laid down; but experience has shown that no aid from the parent stock can give permanent vigour to a branch in which vitality did not previously exist, while on the other hand a little timely encouragement serves as a very useful stimulus to local exertions.

The representation of country towns by Members of the Council, and the discussions which take place at the Annual Meetings, afford the opportunity of maintaining the equilibrium and discussing local claims.

The remarks at the late Anniversary respecting the North British Branch of the Society elicited an explanation of the real state of the case, which will have the effect of clearing up previous misapprehensions. The maintenance of harmony, and a good understanding between North and South Britain, in the business of the Society, is of the greatest importance to its general prosperity; and if a question should occasionally be raised on some matters of detail, this should be received as an indication of a desire to give the subject that investigation which its importance deserves, and not as a symptom of distrust or lukewarmness. It is desirable to promote a free and unreserved discussion at all the meetings of the Society; and when this is conducted in a proper spirit, the result is either a satisfactory explanation, or some practical suggestion which may at a future time be adopted. Several regulations now in force have originated in this manner, and have been found to answer the purpose intended.

PHARMACY IN IRELAND.

Pharmacy, as a profession or business, has no separate existence in Ireland. It rests between the Apothecaries who are Medical Practitioners, and the Druggists who are mostly engaged in a general trade, comprising the sale of oils, colours, spices, grocery, &c., and who are not allowed by law to dispense prescriptions. To the former class Pharmacy is a subordinate pursuit, subservient to the requirements of their profession, and therefore not claiming their attention with a view to its scientific advancement; to the latter it is merely a trade, conducted on the usual principle of regulating the supply by the demand.

This state of affairs is not favourable to the progress of Pharmaceutical science, or the elevation of Pharmacy on its own merits, to the rank of a profession. Individual efforts and researches may from time to time lead to practical results, and both in the College of Physicians and the Society of Apothecaries in Dublin there are members whose names are known to the profession as authors of valuable works on subjects relating to Pharmacy, or contributors of Chemical papers to periodical journals. But a science or profession having no source of advancement besides the precarious patronage of men whose regular avocations lead them rather in another direction, can scarcely be expected to keep pace with the times and rise in the esteem of the public.

Our attention has been directed to this subject in consequence of the efforts now in progress for effecting the amalgamation of the three Pharmacopœias. As the Pharmaceutists in England and Scotland are endeavouring to promote this result by their influence, and by offering such assistance as their practical experience may enable them to afford, it naturally occurred to us that the services of our brethren in Ireland might be called into requisition in aid of an undertaking in which every dispenser of medicines is interested.

But here a remarkable anomaly presents itself;—strictly speaking we have no brethren in Ireland. We can scarcely claim fraternity with the Society of Apothecaries, which consists of Medical Practitioners, and corresponds more nearly to the Society of Apothecaries of London; nor can we, on such a question as the one before us, fraternize with the Druggists, who are not allowed by law to dispense a prescription, and who, therefore, cannot be supposed to be practically interested in the compilation of the Pharmacopœia. Believing as we do that Pharmacy is deserving of a separate rank among the professions, and that this division of labour is conducive to the progress of science and the interests of the public, we have opened a correspondence with our professional friends in Ireland on the subject, and we are not surprised to be informed that the system which prevails in that part of the kingdom is not altogether satisfactory. A detailed account of the origin and constitution of the Apothecaries' Company and the operation of the existing laws relating to Pharmacy in Ireland, would occupy more space than we can give to the subject in this number. Moreover, we are not yet in possession of all the facts bearing upon the question; but intend to resume the subject with a view of promoting a friendly co-operation between the Pharmaceutists in Ireland and our own body in England and Scotland, in the advancement of objects in which we are all mutually interested. The Apothecaries in Dublin have equally with ourselves experienced the inconvenience arising from incongruities between the three Pharmacopœias, and they are quite disposed to exert all their influence with the Members of the Dublin College in favour of a national Pharmacopœia.

INCONSISTENCIES BETWEEN THE THREE PHARMACOPŒIAS.

It has been suggested that the publication of a brief statement, giving a few examples of the difference in the strength and composition of preparations ordered under the same name, and showing the danger and inconvenience arising from such inconsistency, might have the effect of placing in a prominent light the necessity of early attention to the subject on the part of the three Colleges. The following examples are, therefore, selected as specimens, of which many of a similar kind may be found on comparison of the three Pharmacopœias. They may be classified under three heads. First, cases which might lead to

serious or fatal results. It is remarkable that some of the most glaring inconsistencies occur among the most powerful medicines—such as hydrocyanic acid, preparations of opium, aconite, &c. In some of the formulæ, the strength being twice or three times as great in one Pharmacopœia as in another—a prescription written with reference to the weaker formula, and prepared in the part of the kingdom in which the stronger one is the legal standard, would be twice or three times as strong as the prescriber intended.

Cases which might lead to Serious or Fatal Results.

Acetum Colchici.—The Dublin formula is three times the strength of the Edinburgh and London.

Acetum Opii.—The Edinburgh more than three times the strength of the Dublin.

Acidum Hydrocyanicum Dilutum.—The Edinburgh formula is nearly twice the strength of the London, and the Dublin rather stronger than the London.

Extractum Aconiti.—The Edinburgh is about half the strength of the London.

Extractum Jalapæ.—The Edinburgh is about three times the strength of the London.

Infusum Digitalis.—The London is half the strength of the Edinburgh and Dublin.

Liquor Morphiæ Acetatis and *Liquor Morphiæ Hydrochloratis.*—The formulæ of the London College are about double the strength of the Edinburgh and Dublin.

Tinctura Aconiti.—The Dublin formula is considerably stronger than the London.

The second class includes cases which are not likely to occasion loss of life, but which cause inconvenience, and not unfrequently bring discredit on the dispenser of the prescription when he is not in fault. It may be medicinally of no importance whether a preparation contain one essential oil or another, whether a blistering fluid be of one particular strength or rather weaker. But a patient being accustomed to a medicine which has a particular smell, taste, appearance, and effect, and observing that when prepared according to the same prescription at another place, it is quite different in one or more of these respects, naturally concludes that a mistake has been made, and loses confidence in the dispenser.

Cases which occasion Inconvenience.

Acetum Cantharidis.—The Edinburgh formula contains fifty per cent. more cantharides than the London, and the Dublin is twice the strength. The acetic acid in each preparation differs in strength from the others.

Emplastrum Cantharidis.—The Edinburgh plaster contains less cantharides than the London or Dublin.

Infusum Catechu Compositum.—The Edinburgh formula has the addition of syrup.

Infusum Gentianæ Compositum.—The London formula is half the strength of the Dublin and Edinburgh, and the latter differs in composition.

Pilula Colocynthidis Composita.—The same name is applied to three preparations differing from each other in composition and in dose.

Pilula Rhei Composita.—The London formula contains oil of carraway, the Edinburgh and Dublin have oil of peppermint.

Acidum Aceticum.—There are eight different strengths in the three Pharmacopœias.

Acidum Aceticum Camphoratum.—The Dublin formula contains more camphor, and the acid is weaker than that of the Edinburgh College.

Confectio Aromatica.—The London formula contains chalk and nutmeg, which are wanting in the Edinburgh and Dublin. The two latter differ from each other in composition and flavour.

Confectio Sennæ.—The formulæ of the three Colleges differ; that of the Edinburgh is the strongest.

Decoctum Aloes Compositum.—The Dublin formula contains fifty per cent. more aloes than the Edinburgh.

Emplastrum Opii.—The London formula has 1 ounce of opium in 11 ounces of plaster; the Edinburgh, 1 in 31; the Dublin, 1 in 10.

Pulvis Aromaticus, intended as synonymous with *Pulvis Cinnamomi Compositus.*—The three formulæ are all different from each other.

Tinctura Capsici.—The Dublin more than twice the strength of the London and Edinburgh.

Tinctura Cinchonæ of the London College is made with yellow bark, that of the Dublin with pale bark.

Tinctura Cinchonæ Composita—The London and Dublin Colleges order pale bark, the Edinburgh, yellow bark.

The third class comprises cases of less importance, but nevertheless objectionable, as giving official sanction to deviations from accuracy. It may be of

little practical consequence whether an ointment be rather stronger or rather weaker than the prescriber intended, whether the dose of calumba or rhubarb be slightly varied. The patient might not observe the difference, yet the fact that the same prescription admits of two interpretations according to the locality in which it is prepared, tends to impress on the mind of the apprentice or assistant an idea of recklessness on the part of the Colleges of Physicians in regard to accuracy in the compounding of their prescriptions. A scrupulous correctness in manipulation is the primary lesson inculcated at the dispensing counter, and if young men discover that Physicians are careless in the instructions they give, and that the same term in a prescription may have two or three meanings, the circumstance is likely to have a prejudicial influence on their minds so far as relates to the general importance of accuracy. When an apprentice knows that ℥j. in Ireland means gr. 54.7, and that in England and Scotland it means gr. 60, is there anything more natural than this inference in his mind—"What is the use of scales? I can guess ℥j. within 5 grains."

Needless Inconsistencies of minor Importance.

Confectio Rosæ.—The formulæ of the three Colleges are all different.

Decoctum Sarsæ Compositum.—The Dublin formula has about half the quantity of sarsaparilla ordered by the London or Edinburgh.

Decoctum Scoparii Compositum.—The Edinburgh orders juniper tops in place of berries, and bitartrate of potash in place of dandelion root.

Infusum Calumbæ.—The relative strengths of the three formulæ are: Dublin, 6; London, 5; Edinburgh, 4.

Tinctura Calumbæ.—The Dublin formula is 50 per cent. stronger than the others.

Tinctura Zingiberis.—The Dublin tincture is nearly three times the strength of the London and Edinburgh.

Tinctura Rhei Composita.—The formulæ of the three Colleges differ both in strength and composition.

Tinctura Tolutana.—The Edinburgh and Dublin formulæ are nearly double the strength of the London.

Unguentum Creasoti.—The London formula is stronger than the Edinburgh, and the Dublin twice the strength of the London.

Unguentum Sabinæ.—The Dublin formula orders the *powder* instead of the fresh tops.

Vinum Aloes.—The formulæ differ in strength and composition—the London is stronger than the Edinburgh.

The above examples are taken at random for illustration. Others may be found in almost every page of Squire's "Three Pharmacopœias," where the corresponding preparations are conveniently placed in juxtaposition, showing at a glance the difference in strength, composition, &c. In making the comparison it is necessary always to bear in mind the difference in the weights in the Dublin formulæ. For example,—the formula for tincture of cantharides is nominally the same in the three Pharmacopœias (namely, half-an-ounce of cantharides to two pints of proof spirit), but the Dublin half-ounce being about ten per cent. less than the London and Edinburgh half-ounce, the Dublin tincture is weaker in proportion. In some cases the calculation is not so simple. Tinctura Aconiti, P. L. is ordered in the proportion of fifteen ounces *troy* to two pints; the Dublin formula is ten ounces *avoirdupois* to one pint. How much per cent. is the one tincture stronger than the other?

The three Colleges of Physicians are by this time fully aware of the fact that a change is necessary, and that the dispensers of prescriptions have a just claim to relief from the perplexity arising from the existing inconsistency in the terms and preparations of the respective Pharmacopœias. Communications have recently taken place on the subject, which are likely to result in an official correspondence between the Colleges with a view of removing the source of complaint, and producing a national Pharmacopœia. Some difficulty will occur in reconciling the existing differences, but by a mutual disposition to concede minor points, for the sake of attaining the grand object in view, there is every reason to believe that all obstacles will be surmounted.

THE SALE OF SPIRIT OF WINE.

NEW EXCISE REGULATIONS.

In another part of this number (page 556) will be found the first portion of a report, which is of great importance to British manufacturers who use spirit of wine in their processes. The high duty on spirit in this country has acted as a prohibition to the manufacture of many chemicals, and has also operated injuriously in some other branches of the arts and manufactures. The problem which has hitherto required solution is the question—How can the manufacturer be relieved from this disadvantage without interfering with the Excise laws relating to the sale of spirit of wine as a beverage? It is the purpose of the report before us to suggest a means by which the desired object may be attained. This consists in allowing spirit, mixed with 10 per cent. of wood-naphtha, to be sold duty free, under certain regulations. Such spirit will not be applicable to the manufacture of sweet spirit of nitre, pure sulphuric æther, or any preparation in which spirit is taken or administered internally. The regulation being intended for the benefit of manufacturers, and not for the retailing of the mixed spirit, it will be obtainable in quantities of not less than 10 gallons, and can only be used for the purpose specified at the time of purchase.

MEDICAL BILLS FOR 1855.

Two Medical Bills are in embryo at the present time. One of these, entitled a "Draft Bill for an Act for regulating and improving the Medical Profession," emanates from some members of the profession in Edinburgh, although we understand that the College of Surgeons of Edinburgh are not warm in its favour. The other, which has not yet seen the light, but is known behind the scenes as Mr. Headlam's Bill, is popular in some medical circles in England and Ireland. It differs in some respects from the Edinburgh draft, but neither measure is sufficiently advanced in general favour with the profession to induce us to devote the space necessary for a complete analysis. We may remark, however, that the Edinburgh draft claims our attention, on account of the definition clause, which is drawn on the model of the corresponding clause in several previous bills, and is as follows:—

"2. The words following shall have the signification hereby given to them, unless there be anything in the context repugnant to such signification: 'Medical Practice' or 'Medical Profession' shall include and signify the practice of 'Medicine, Surgery, Midwifery, and Pharmacy;' 'Medical shall include 'Surgical;' 'Council' shall signify the 'Medical Council constituted under this Act;' 'Registrar,' 'Secretary,' and 'Treasurer,' shall signify the 'Registrar, Secretary, and Treasurer for the time to the said Council in England, or in Scotland, or in Ireland, as the case may be.'"

The propensity to include Pharmacy in the definition of the term "Medicine," is rather troublesome, and obliges us to watch narrowly the import and meaning of the several clauses in which the term occurs. Although the definition is guarded by the words "unless there be anything in the context repugnant to such signification," two astute lawyers might argue for a week on the question of repugnance. To guard against this contingency, it is necessary to add a clause exempting Pharmaceutists from the operation of the Act. Mr. Headlam's Bill contains a clause providing for the publication of a national Pharmacopœia, not by the Colleges of Physicians, but by the Medical Council proposed to be appointed under the Act. The removal of the jurisdiction of the Pharmacopœia from the parties hitherto entrusted with it, will not be satisfactory to the Colleges. It is, however, understood that this clause will not be insisted on if it should appear likely to injure the popularity of the Bill. We have reason to believe (as above stated) that the three Colleges are about to enter voluntarily upon an official communication with each other, with a view of producing a joint Pharmacopœia. If this should be carried into effect, there will be no necessity for the interference of the Legislature on the subject.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

CONVERSAZIONE.

The Conversazione, of which notice had been given, was held on Tuesday evening, the 15th of May, at the house of the Society. In addition to a numerous attendance of Members, several of whom had come up from the country to be present at the Anniversary Meeting, there was on this occasion an unusually large number of visitors who responded to the invitation of the Council, and among them were many eminent Chemists and other scientific men.

The Council were indebted to the following gentlemen for contributing objects of interest, which were displayed in the rooms thrown open to the company, and presented abundant matter for profitable and interesting conversation :—

To the Master of the Mint, for fine specimens of aluminium, tellurium, and crystallized apatite.

To Mr. Gassiot, for a Gyroscope, which was explained and illustrated by the President.

To Messrs. Watkins and Hill, for a Gyroscope, differing in form from the preceding, and a Wheatstone's apparatus for illustrating the wave theory of light.

To Mr. Ingall, for a model illustrating a method which he has recently patented for indicating at the terminus and stations of a railway the exact position of the trains on the line.

To Messrs. Godfrey and Cooke, for a complete series of the products obtained from amber.

To Mr. C. M. Archer, for a specimen of pulp prepared from old printed papers, and chemically purified from printer's ink and other impurities.

To Mr. Wilson, of Price's Candle Company, for the *Crimean Candle Stove*, which was constructed by the Company with the view of affording to our soldiers in the Crimea an easy and economical means of warming their tents and cooking their provisions. Also fine specimens of crystallized palmitic acid and pure glycerine, produced in the process recently patented for decomposing fats by steam at an elevated temperature.

To Mr. Tilghman, for a series of products illustrating his patented process for decomposing fats with water at a high temperature.

To Messrs. Bourne and Taylor, for a new oil-bottle, and infusion-bottle for preserving infusions by the exclusion of air.

To Dr. Stenhouse, for his charcoal respirators, and a specimen of platinized charcoal, which he proposes to substitute in certain cases for common charcoal, in the construction of the respirators.

To Mr. Davenport, for specimens of citrate of iron, citrate of iron and quinine, iron alum, and acetate of lead.

To Messrs. Johnson and Co., Hatton Garden, for specimens of iridium, oxide of iridium, chloride of iridium, and oxide of uranium.

To Mr. Morson, for specimens of pure and colourless glycerine obtained by saponification, and also by distillation; fine specimens of native silver and copper, and a collection of specimens of spurious opium.

To Mr. Allchin, for a leech conservatory. This consists of a glass tank with a moveable glass cover, and arrangement for admitting air through a perforated metallic plate. Some coarse gravel is placed at the bottom of the tank, which is about half filled with water, and into it are put one plant of valisneria, ten water-snails, and about one hundred leeches. A permanent balance of animal and vegetable life is thus maintained, and no necessity occurs for changing the

water. The specimen exhibited had been kept without changing the water for ten months. The leeches were in a very healthy state, and the water clear and sweet.

To Mr. Thomas, of Pall Mall, for a fine specimen of crystallized gallic acid, and some photographic apparatus.

To Mr. Shaw, for a decanting machine.

To Mr. Griffin, for a new blowpipe, some German glass apparatus for estimating carbonic acid, &c., and a model of Appold's pump.

To Mr. Pepper, of the Polytechnic Institution, for Symonds' gutta percha electrical machine.

To the Gutta Percha Company, for a variety of the products of their manufacture.

To Messrs. Pettit and Co., gas engineers, of New Oxford Street, for a variety of apparatus for the application of gas to chemical and other purposes.

To Mr. Cox, of Brighton, for a specimen of his patented tasteless pills.

To Mr. Hyde Clarke, for a model of Berdan's quartz-crushing machine.

To Mr. Adnam, of Maiden Lane, for a model of a drying stove, for drying groats, &c.

To Messrs. Steiner, Gotty, and Co., of Accrington, for specimens of pigments prepared from antimony.

To Mr. Vignier, of King Street, Holborn, for a collection of French chemical apparatus.

To Messrs. Powell and Sons, of Whitefriars, and Mr. Phillips, of Oxford Street, for specimens of English ornamental glass.

To Mr. Huskisson, for some specimens of ornamented sheet glass produced by a new process.

To Mr. Polyblank, Mr. Mayall, Mr. Hahneman, Mr. Knight, and Messrs. Horne, Thornthwaite, and Co., for photographic pictures, portraits, and stereoscopes.

To Mr. Young, of Queen Street, Cheapside, for his binoxide lamp and gas-burner, and some new stoppers for bottles and jars.

In addition to the foregoing, Mr. Coffey's new system ef evaporation was exhibited in partial operation, but the time which had been devoted to the fitting-up of the apparatus was too short to admit of the process being shown under favourable circumstances.

This process will be fully explained in a subsequent number of this Journal.

FOURTEENTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 16th.

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

ADDRESS OF THE PRESIDENT.

At our last Annual Meeting I had to allude to the difficulties in which the Society was placed by the legal proceedings instituted by one of our own Members, then a Member of the Council. I had earnestly hoped that before this day, on retiring from the office I have now for two years had the honour of holding among you, we should have had the satisfaction of reporting that all differences had been legally, if not amicably, adjusted; and that our course in future was free from any legal impediment. This is not the case. Our opponent has not been satisfied with the unanimous opinion of the four judges of the Court of Queen's Bench, in which the action was brought; but has carried his suit into a Court of Error, as stated in the Report about to be presented to you. Whatever may be the terms of the decision on the hearing of the argument in the other Court, it is satisfactory to find that the policy

adopted by the Council, and the principles on which they have acted since the passing of the Pharmacy Act, have been so completely confirmed and sanctioned in every respect by the unanimous decision of the four judges. I therefore rely on your support under these temporarily discouraging circumstances, and judging from the known character of the candidates on the list for election, I have no doubt the new Council will energetically and faithfully devote themselves to the cause of order and the prosperity of the Society.

We are but men, tradesmen, semi-professional, in a laborious, and in the main an ill-requited occupation, considering the responsibility that attaches to it; and if, in carrying out our great object of education and improvement in our social position, we should occasionally be at fault as to the best mode of overcoming difficulties as they arise, or if differences of opinion in such cases should occur, we must endeavour to preserve harmony and good-will in judging of each other. Those amongst us who accept the office of administering the laws of the Society, must do so purely from a desire to promote the general good; and whether they obtain full credit for their intentions or not, they must rest satisfied with the conviction that they have endeavoured to act for the best. The imperative duty of submitting to the majority is essential to prosperity as a general rule, although it does not follow that the majority is in every case on the right side. But we may be sure of this, that truth will ultimately prevail; and this end will be best secured by the influence of charity towards each other in all our deliberations. Let us therefore avoid bitter differences, that lead into the labyrinths of Law Courts, from which we know not the exit or termination.

The law has given us a title by which we are distinguished from those who have taken no pains to protect the general interests or promote the education and advancement of the body of Chemists and Druggists throughout the country. The value of this title depends entirely on ourselves. It should be a guarantee of honour, talent, and integrity; and if as a body we do not benefit by it, the fault will rest solely with ourselves. I would earnestly recommend you to discourage quackery and puffing, for although such practices will probably exist to the end of time—and it may be difficult altogether to escape their influence—we need not lend ourselves to the system. An enlightened course of general and Pharmaceutical education will be a great, though but a partial remedy, and unless this is accompanied by a just sense of our moral and religious obligations, an increase of mere worldly knowledge may fail to confer that honourable advantage on us as a body which is so much to be desired.

From time to time, Members of the Council have received letters complaining of the irregular and dishonourable conduct of Members of the Society, sometimes enclosing handbills and advertisements of an objectional character. The Pharmaceutical Society can no more prevent such irregularities on the part of unscrupulous Members, than the Apothecaries, Surgeons, or Physicians can suppress actions of a similar character among their body. As a specimen of the advertisements referred to, I will read one from a Newcastle newspaper:—

"HEALTH IS THE GREATEST BLESSING.

"————, Dispensing Chemist and Druggist (established in business Eighteen Years), Member of the Pharmaceutical Society of Great Britain, incorporated by royal charter, ———, Newcastle.

"———— may be consulted respecting any of the undermentioned complaints. From his long personal experience amongst these diseases he begs to assure those persons who may apply to him, that he has hitherto been most successful in the cure of some of the most deeply-rooted and inveterate ailments that flesh is heir to. His treatment is mild, safe, and efficacious, no medicine being administered without a good prospect of success.

"Diseases of the Chest, sympathetic or organic. Bronchitis, Croup, Chin Cough, Hooping Cough, Consumptive Cough, Hard Dry Cough, Influenza, Spasms of the Chest, Vomiting of Blood, Diseases of the Breast, Chronic or Irritable Diseased

Joints or Pereosteum, Bone-Setting, Abscesses, acute or chronic, Ague, Purulent Ophthalmia, Cataract, firm, hard, soft, or membraneous, Paralysis, Rickets, St. Vitus's Dance, Rose, or St. Anthony's Fire, Psoriasis. or Skin Diseases, Itch, simple or confluent, Erysipelas, Rheumatic Gout, Scurvy, Sciatica, Neuralgia, Tic Douloureux, Leprosy, Goitres, Marasmus, or wasting away of the Flesh, Impurity of the Blood, Diabetes, Fistula in Ano, Fistula in Perinæo, Scrofula, Piles, internal and external, hard, soft, or bleeding, Phagedenic Wounds, Polypus, Pains and Eruptions of the Face. ————, Dispensing Chemist and Druggist (established in business 18 years) Member of the Pharmaceutical Society of Great Britain, incorporated by Royal Charter, ———, Newcastle."

This is an illustration of defective education, mistaken policy, and ill-directed energy, and it is greatly to be deplored there should be found men in our ranks capable of issuing puffs so absurd and disreputable. I hold in my hand a similar specimen from a person styling himself M.R.C.S., from which it is quite clear that we do not stand alone. Honourable men living in close proximity to such, may reasonably complain of their proceedings, but it is hardly fair to lay the onus, responsibility, and odium upon the Society, which has done so much to remove the evil and elevate the character of the whole body. An education which shall comprise a better knowledge of the history and properties of the substances we employ, with a more enlightened view of our duties and responsibilities, will tend greatly to reduce the number of those who do not hesitate to have recourse to such questionable means of profiting by the weaknesses or misfortunes of their fellow-men.

On the subject of education, I would seriously caution principals and the rising generation of Pharmaceutists against entertaining or encouraging exaggerated notions with regard to a supposed professional dignity. Our profession or calling is one that necessarily involves a large amount of physical and mental labour, and this will always be the case, possibly even to a greater extent than hitherto. It must not therefore be supposed because our status is improving, that we shall be able by any means to dispense in our own persons with the use of apron and duster, and delegate them entirely to the shop-boy, as things of other days, and incompatible with modern notions of gentility. It must be borne in mind, that the most successful men among us, those held in the highest esteem by their customers and the medical profession for their tact and ability, are those who have cheerfully devoted themselves to do anything or everything their business and position required of them, from the cleaning a knife, a window, or a bottle, up to the most difficult and responsible task that could be imposed on them; men who have considered nothing *infra dig.* that was not dishonourable, and who have laboured early and late in the course of their duty to acquire a competent knowledge of their business. The public require in us a large amount of general knowledge, which industrious habits and careful observation will enable most men to acquire; and the smallness of our gains, in proportion to our responsibility, necessitates a large amount of physical exertion and unflinching endurance. The Almighty has said: "In the sweat of thy brow shalt thou eat bread;" and so long as we require bread to eat, and the public require our varied services at all hours of the day and night, we are not likely to be exceptions to this law, but must cheerfully meet the conditions in which we are placed, and make our occupation the chief source of our pleasures. These observations have been elicited by the increasing tendency existing among young and inexperienced persons, and in none more than among ourselves, to set a false value on education, and to disparage what they are pleased to call unskilled labour, forgetting that if all men were profound scholars, the majority must still follow laborious occupations for a subsistence and our social well-being, which brings me again to the fact that there is nothing beneath the dignity of a man that is not dishonourable.

I avail myself of this opportunity of submitting for your consideration a plan

for acquiring a building better adapted than the present one to the wants of the Society, and not subject to the liabilities and restrictions of a leasehold tenancy. You are aware that the premises now occupied by the Society are held on a running lease. This is terminable at the option of the Society in about five years from the present time, during which interval the plan which I am about to suggest might, if approved, be brought to maturity.

The possession of a freehold building, comprising within its walls all the requisites for carrying on the business of the Society in the most efficient and creditable manner, would be a great and substantial advantage. It would be at the same time a centre of attraction and a bond of union among the Members, who (if they would make up their mind to lay aside jealousy and foolish disputes) possess the power of acquiring at a small individual sacrifice, a permanent and complete building for carrying on the business of the Society.

I apprehend that this would cost, including the purchase of a site, not less than £15,000, of which a portion (probably £5000) might be raised by a voluntary subscription. As the number of Members and Associates nearly equals the number of pounds above mentioned (£5000), an average of £1 from each would be almost sufficient for that purpose, and if some should give less than £1, others might be disposed to give £3 or £5 for the sake of promoting so desirable an object. The remaining £10,000 might be raised on the principle of a tontine, in shares of £5 or £10, for which the Society should guarantee four per cent. interest, equal to a rental of £400. As each shareholder dies, his share would lapse, and the interest would be added to the amount payable to the other shareholders. The Society would take a portion of the shares, appropriating for that purpose such surplus capital or income as could be spared; and paying interest on such shares as continued in private hands so long as any shareholders survived. The last surviving shareholder would receive for the remainder of his life the whole of the interest on the shares which had lapsed, and on his decease, the whole would become the property of the Society, without any future incumbrance or rent.

This outline of the plan has been submitted to a few Members capable of forming a judgment of its practicability. It has by them been considered favourably, and to be the most likely means of accomplishing this desirable object. Should the approbation of the Members and Associates offer sufficient encouragement, plans of a building and details would be prepared with the least possible delay, and circulated among them. It may be borne in mind, too, that it will not be needful to confine the disposal of the shares to the Members and Associates. Any person not a Member of the Society would be at liberty to purchase, although it would be more honourable and creditable to us if it could be accomplished entirely by our own body.

In conclusion, allow me to thank you most cordially for the sympathy and support so generously afforded the Council as a body, and myself personally as President, in the various and arduous duties that have devolved upon them since we last met together in this room. Also, to express a hope that good humour and moderation will characterize every discussion that may arise out of the business of the day. Mr. Smith will now read the Report.

REPORT OF THE COUNCIL.

FINANCIAL REPORT.—RECEIPTS AND EXPENDITURE,

From January 1st to December 31st, 1854.

RECEIPTS.

	£	s.	d.
Balance in Treasurer's Hands	555	10	1
19 Life Members' Fees	194	5	0
Benevolent Fund:			
Subscriptions 43 19 0			
Interest 125 19 7			
	169	18	7
Government Securities, Interest ...	210	16	10
398 Town Members' Subscriptions... 417 18 0			
1943 Country Members ...2040 3 0			
367 Associates 192 13 6			
360 Apprentices 189 0 0			
	2839	14	6
Fees:			
Pharmaceut. Chemists 47 5 0			
Assistants 69 6 0			
Apprentices 86 2 0			
	202	13	0
Arrears of Subscriptions	110	5	0
Lecture Fees	9	9	0
	£4292	12	0

EXPENDITURE.

	£	s.	d.
Life Members' Fund Investment	168	8	9
Benevolent Fund: Gratuities	45	0	0
Sundries	6	3	0
Repayments	11	0	9
House Expenses	32	1	6
Rent, Rates, and Taxes	344	5	10
Fixtures and Fittings	33	0	0
Postage	67	9	2
Stationery	12	0	7
Printing	56	2	6
Collector's Commission	41	11	11
Board of Examiners	33	12	0
Grant to Branch of Society in Scotland	61	4	2
Travelling Expenses, Country Members of Council	76	12	5
Salaries	525	0	0
Wages	179	4	0
Journals	944	7	6
Delivery of Journals	77	12	0
Library	25	12	10
Lectures, Conversazione, and other Expenses of the Scientific Department	557	7	7
Museum	4	12	8
Advances to Messrs. Bracc and Colt, Solicitors	667	10	0
Balance in Treasurer's hands	322	13	7
	£4292	12	0

We, the undersigned Auditors, have examined the Accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1854:

		£	s.	d.
On Account of the General Fund.....	New 3 per Cents.	6036	7	1
Benevolent Fund ...	3 per Cent. Consols...	4391	6	2
Life Members' Fund	3 per Cent. Consols...	993	5	8
And at that date there was due to the Benevolent Fund.....		125	8	7
And to the Life Members' Fund		62	11	3

WILLIAM AYSCOUGH HALLOWS,
ARTHUR BOWDLER HILL,
FRANCIS WARD,
WILLIAM BOLTON,
} *Auditors.*

March 13th, 1855.

In the last Annual Report the Council briefly referred to the origin and progress of the proceedings against the Society, the nature of the attack, and the policy which they had adopted under legal advice for protecting the interests of the Members. At that time the case had not been fully argued in the Court of Queen's Bench, and although the Council were satisfied as to the justice of their cause, and had every reason to anticipate a favourable result, yet taking into consideration the proverbial uncertainty of the law, and the determined hostility of the proceedings, they could say nothing with regard to the future beyond the expression of a sanguine hope that the defence would prove successful.

The Council may now congratulate the Members upon the result of the argument in the Court of Queen's Bench, as shown by the very positive and satisfactory decision pronounced by Lord Campbell as the unanimous opinion of the four judges, after a most careful scrutiny of the law and the facts of the case.

This judgment was a complete confirmation and sanction of the policy which the Council had pursued in framing the Bye-laws and carrying the Pharmacy Act into operation, and it had an almost immediate effect of giving a favourable stimulus to the several departments of the Society—the healthy progress of which had been retarded by the previous state of suspense. The opponent of the Society, however, gave notice of his determination to pursue his hostility by an appeal to a Court of Error, the hearing of which was fixed for the 24th of April; but in consequence of a clashing of engagements on the part of Sir Fitzroy Kelly, the case was adjourned until next term, and will probably be finally decided about the beginning of June. The Council think it right to state that a proposition was submitted to them to the effect that if they would, on behalf of the Society, relinquish the claim to costs, a compromise might possibly be effected; but they did not feel justified in entertaining such proposal. While the Council deeply regret the wasteful expenditure and temporary injury to the Society occasioned by a factious proceeding from which no advantage could possibly arise under any circumstances, they feel that they have but one duty to perform, namely, that of resisting the aggression, and defending the interests of the Society, and of the Members individually attacked, under the best legal advice which they can obtain. They entertain little or no apprehension as to the ultimate result, and trust that the Members will continue to support them in these endeavours to extricate the Society from its present state of suspense, and that its future prosperity will reward them for such persevering efforts in its behalf.

THE BOARDS OF EXAMINERS.

The great influx of Candidates for examination during 1852 and 1853, followed by the depressing influence of the legal proceedings, occasioned a considerable falling off in the number during the past year. Many young men, stimulated by the notice issued by the Council soon after the passing of the Pharmacy Act, to the effect, that after a certain date the examinations would be more stringent, came forward earlier than they would otherwise have done. Subsequently, the doubts which prevailed as to the result of the attack on the Society discouraged some of those who had been preparing themselves for examination; and as it is usually the case that rumours are exaggerated, it is not surprising that some even questioned the utility of joining a Society, which they believed to be in a precarious position. The publication of the Judgment pronounced in the Court of Queen's Bench produced a favourable reaction, and after an interval of inactivity, the examiners resumed their functions. The depression above alluded to was more marked in Scotland than in England, which the Council are informed arose in part from the unwillingness of young men to pay the fees at a time when they had no confidence in the permanence of the Society. Several Candidates resident in the Colonies have visited this country for the purpose of passing the examination and obtaining the diploma of the Society, which the Council have no doubt will be held in equally high estimation at home, when the legal disputes are finally settled. The total number who passed the examinations during the year 1854 are as follows:—

Classical ... 40 —— Minor ... 38 —— Major ... 18.

THE SCHOOL OF PHARMACY.

The above observations on the fluctuation in the attendance at the examinations are equally applicable to the School of Pharmacy, but the depression which for a time existed in this department has recently been succeeded by renewed activity.

On reference to the last Annual Report, the Council see no reason to swerve from the opinion therein expressed, with regard to the utility of the School, and the expediency of continuing it. They consider the expenditure devoted

to this object well bestowed, and desire to encourage the Associates and Apprentices who are able to take advantage of it, not to neglect so desirable an opportunity of acquiring a knowledge of the branches of science connected with the business of a Pharmaceutical Chemist. The subjoined account, instead of showing a balance in favour of the Professor, as on former occasions, shows a balance against him, a circumstance the Council very much regret. It should, however, be stated, that the account refers to the period during which the depression above referred to influenced the School, the number of pupils having been during that time less than half the average, while the current expenses were not diminished in the same proportion.

RECEIPTS AND EXPENDITURE IN THE LABORATORY,

From the 1st of October, 1853, to the 31st of July, 1854.

RECEIPTS.	£	s.	d.
Fees from 21 Pupils	342	6	0
Loss to Professor	64	3	10
	£406	9	10

EXPENDITURE.	£	s.	d.
Drugs, Chemicals, Apparatus, &c.	157	2	5
Gas, Coal and Coke	53	13	4
Repairs, Cleaning, &c.	15	2	1
Salaries to Assistants, &c.	180	12	0
	406	9	10

The above account does not include any charge for rent, rates, and taxes, or the expenses of the lectures, which items are comprised in the general financial statement.

THE EVENING MEETINGS.

The Pharmaceutical Meetings have been well attended, and the discussions have been carried on with spirit. The supply of papers has been good, and some of the subjects introduced having been practically interesting, have tended to promote a more general participation in the proceedings than was observable during previous years. The preparations of the Pharmacopœia, which are now officially under the consideration of the Society, will furnish materials for discussion at future meetings.

THE PHARMACOPŒIA COMMITTEE.

It was formerly a source of complaint on the part of the Pharmaceutical Chemists of this country, that they were not recognised as an educated body, and that the Pharmacopœia by which they were expected to compound their preparations, was compiled without any appeal to their practical experience. They frequently suffered inconvenience, and sometimes incurred discredit, in consequence of changes in the nomenclature, and ambiguous terms introduced into that work; their daily manipulations at the counter and in the laboratory enabled them to point out such defects, and occasionally to suggest improvements, and yet they were never officially communicated with on the subject. In establishing the Pharmaceutical Society, they provided a remedy for their anomalous position, and having taken the proper steps for becoming an educated body, they are now generally recognised as such. Their services are called into requisition, and will be acknowledged in proportion to their endeavours to make their practical experience available for the advancement of the profession and the benefit of the public.

The appointment of a Pharmacopœia Committee by the Society to communicate with a Committee of the College of Physicians is an important and satisfactory step in advance, and the Council hope the result of these labours will be manifest not only in an improvement of the London Pharmacopœia, but eventually in the amalgamation of the Pharmacopœias of England, Scotland, and Ireland, into one national work.

THE LIBRARY AND MUSEUM.

Thirty Volumes and many periodicals have been added to the Library during the past year. The attendance has not been numerous, and the number of books

borrowed from the Library during the past year has averaged about two per diem.

Some interesting additions have been made to the Museum, which is without doubt the most extensive and complete of the kind in the kingdom. As the number of specimens increases, a catalogue for reference is much wanted, and the Council have had this subject under consideration, but have not yet been able to carry out their intention.

PRIZE MEDALS.

The Council Medal, the establishment of which was mentioned in the las Annual Report, is now generally awarded, instead of books, at the annual examination for prizes. The die of the Pereira Medal is also completed, and will become available as soon as an opportunity occurs.

THE NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

The Annual Report of this branch of the Society, which was published in the Provincial Transactions of last month, affords encouraging evidence of the progress which has been made by our brethren in the North, and of the unity which prevails between the Parent Society and the North British Branch. This harmonious and reciprocal action is of great importance not only in furthering the general objects of the Society, but also in promoting uniformity of education, the amalgamation of the Pharmacopœias, and the more cordial cooperation of the Medical Bodies in the three sections of the United Kingdom. The appointment of a Committee of the North British Branch of the Society, in connexion with the Pharmacopœia Committee of the Society in London, will tend to further these objects; and although the result may not be immediately attained, a perseverance in this course of proceeding cannot fail to exercise a salutary influence. The Pharmaceutical Meetings in Edinburgh have, during the past year, been kept up in a creditable manner, and several very interesting papers have been read and published in the Transactions.

PROVINCIAL TRANSACTIONS.

The reports of the Liverpool Chemists' Association, which have from time to time been published in the Transactions, afford satisfactory proof of zeal and activity in that locality. At a recent meeting of the Council an application was made for a grant of money to assist in the establishment of a Museum at Liverpool, and the sum of £50 was voted for that purpose. In passing this resolution, the Council took into consideration the exertions which have been made by the Members in Liverpool, their expenditure in support of the local Institution, comprising Lectures, practical instruction in Chemistry, a Library, and Museum. It was stipulated that the Museum should be open to all Members and Associates of the Society, a condition readily granted.

In Manchester, two Associations which have for some time been in existence are about to be united into one, a measure which the Council think likely to be attended with a good result, as it will concentrate the influence and the educational advantages which have hitherto been divided.

The local Association at Birmingham has been lately in a depressed state. As all institutions of this description are liable to fluctuation, the Council trust the inactivity in this instance is only temporary.

The Council desire to encourage the local Association of Members of the Society in all parts of the kingdom, believing that social and intellectual intercourse tends to promote harmony and organization, and thus increases the interest felt by the Members at large in the objects for which the Society was established, and which can only be carried into effect by the united and persevering efforts of the parties concerned.

Mr. Bottle (Dover) said that at former meetings he had animadverted on the mode of conducting the business of the Society. On the present occasion he ob-

served an error in the account, and moved that the same be referred back for examination. It was a mistake of £10 in the amount stated as the balance in the Treasurer's hands.

The cash-book having been produced, and the account revised and found to be correct, Mr. Bottle withdrew his motion.

Mr. LESCHER moved "That the Report now read be received, and printed in the Transactions of the Society."

Mr. HOLLIER (Dudley) seconded the resolution, and took the opportunity of making a remark on the Benevolent Fund. He regretted to observe that, notwithstanding the great number of Members and Associates, the amount annually subscribed to that fund was so small. He had heard of cases of distress in which the applicants were refused relief because they had ceased to be Members of the Society. He thought the severity of this regulation should be relaxed, as poverty sometimes obliged Members to discontinue their subscriptions, and he would be glad to see a more liberal spirit manifested in regard to this fund. He congratulated the Society on the general tenor of the Report, and the state of the accounts, except with regard to the item legal expenses; and he very much regretted that Mr. Dickinson had thought proper to carry his hostile proceedings to such an extent. No good could possibly arise from it. He regretted the waste of money, but hoped that the Council would, if necessary, expend more in defence of the Society.

Mr. FELLS (Stockwell) inquired respecting the list of Materia Medica issued by the Pharmacopœia Committee. He understood it was sent to all Members, but he had not received a copy.

The CHAIRMAN replied that it was originally intended to send it by post, but it was found to be so voluminous, that the postage would be a serious expense. Copies were therefore sent to every town with the Journals for those who desired them, and any Member could receive a copy on application to the Secretary. About 2000 had been issued.

Mr. BASTICK desired some explanation respecting the items in the account for salaries, wages, and lectures. He observed last year the salaries were £468 15*s.*, this year £525; wages last year, £124 9*s.*, this year, £179 4*s.*; lectures last year, £416 7*s.* 6*d.*, this year, £557 7*s.* 7*d.* He did not ask the question with a view of finding fault, but for the sake of an explanation. As the Members had been congratulated on the satisfactory nature of the financial statement, he wished to know why the items referred to were raised.

The SECRETARY explained that the Council had granted him some assistance which was necessary, on account of extra labour in keeping the registers, and from the legal proceedings. The wages account was also increased by an alteration in the arrangement with the Curator, the services of a boy being required to clean the rooms, &c., and the lecture account as taken from the ledger, included the Conversazione and other expenses of the scientific department, as well as £105 for a medal, which latter expense would not occur again.

Mr. WAUGH inquired whether the Council could state the position of the Society with regard to the legal expenses—could they form any idea as to the probable amount of future demands—within a few hundreds?

The PRESIDENT replied, that the Council were not able to answer the question, but he hoped the future demands would not exceed a very few hundreds.

Mr. HOOPER reverted to Mr. Hollier's remarks on the Benevolent Fund, and said, the subject of persons who had formerly been Members, but who had left the Society, had obtained the attention of the Council, and he hoped some Bye-law would be made to meet such cases.

Mr. JACOB BELL said, it would be difficult to provide for any deviation from the terms of the Charter, but when Members, from poverty, were unable to continue their subscriptions, they should apply for relief, instead of leaving the Society for a few years, and then suddenly recollecting that they might as well try what they could get. When Members inquired what were the advantages of membership, they were told, among others, the chance of relief, in case of need, from the Benevolent Fund. But if those who seceded from the Society were to have the same privileges, great injustice would be done to the Members who, in some cases at great inconvenience, continued to comply with the laws and support the Society.

Mr. WOOLLEY (Manchester) said, they did not generally feel interested in the Benevolent Fund in Manchester, and did not think it a disgrace that the amount

was so small, but thought it rather a disgrace to have such a fund, as it was generally the idle and improvident who would be likely to come upon it, the honest and industrious, with a very few exceptions, being able to provide for themselves.

Mr. DAVENPORT concurred with Mr. Hollier in regretting that the law restricted the distribution of the Fund to Members and Associates. When persons were poor they retrenched in every way, and might cease to subscribe to the Society for want of the means, before they could make up their minds to apply for relief.

The PRESIDENT read extracts from the Charter and Bye-laws, shewing that the Benevolent Fund is for the relief of distressed Members and Associates, their widows and orphans.

Mr. FELLS did not think it a disgrace to have a Benevolent Fund. The Literary Fund, the Medical Benevolent, and many others were examples; but he thought a Bye-law might be made to relax the stringency of the present regulations with respect to the loss of privilege from non-payment.

Mr. PEACOCK inquired whether it was a fact that the Council had received a proposal on the part of Mr. Dickinson that each party should pay their own law costs, and if they would consent to this the proceedings should cease? Had the Council declined such proposal?

Mr. BELL said, the proposal of Mr. Dickinson's solicitors was of a vague character. It was to the effect, that if the Council would commit themselves by agreeing to certain terms, they (the legal advisers of Mr. Dickinson) would *endeavour* to persuade him to stop his proceedings.

Mr. BOTTLE observed, that the income of the Society had decreased from about £6000, which it was last year, to rather under £4000. The North British Branch appeared to be a fungus or incubus, which was a growing evil. There was a grant of £50 to Liverpool. He thought it inexpedient, considering the decreasing income of the Society, to continue these grants. He had contemplated a reduction of the subscription of country Members to 15*s*., but seeing the state of the funds he should not move it at present; but thought it unjust for the London Members to escape the extra half-guinea. He thought the expense of collectors unnecessary. They had no collectors in the country—why should they in London? He had not minutely examined the balance-sheet, but thought the grants to the country should be kept within due bounds, especially where the Members in the locality did not subscribe for the support of their own institutions. He also thought the country Members should have the Journal delivered free of expense, as the Members in London had, and that the collector should be discontinued.

Mr. JACOB BELL reminded the meeting that the nominal income last year included a large sum for entrance-fees of new Members (above £2000). On a fair view of the account, it would be seen that there was no reason to be discouraged—the income was not falling off; and if the Society could be protected from the waste of money in foolish litigation, there would be a surplus of income to add to capital. The subject of the collector had been discussed before. It was not unreasonable in a small town, where there were four or five Members, to expect the local secretary to call on his neighbours and receive their subscriptions; but where the number was 150 or 200, as in Manchester and Liverpool, or above 400, as in London, this could not be expected; and it was a sound economy to employ a collector. The grant to the North British Branch was so moderate that he was surprised at any objection being raised on the subject. The Board of Examiners in Edinburgh were appointed under the Act of Parliament, to carry on the business of the Society. They required a museum, a library for reference, and a room in which to hold their examinations; and when this was all done for the trifling expense of about £60 or £70 a year, while the establishment in London cost several hundreds, he thought the Society had every reason to commend their friends in North Britain for their economy. The lectures and some other expenses were defrayed by fees and local subscriptions, which did not appear in the account. The Members should take a more broad and practical view of the Society, its proceedings, and the objects to be effected; instead of raising objections about trifling matters of detail, and invidious comparisons respecting the privileges of Members in different localities.

Mr. MACFARLANE had not intended to make any remark on that occasion, but he wished to draw attention to a misconception which appeared to prevail respecting the North British Branch of the Society, as it was termed. This was not strictly a branch, but the Society itself, sitting in Edinburgh, and performing the functions

vested in it by Act of Parliament, which contained a clause, requiring that a Board should sit in Edinburgh for the examination of candidates in Scotland. Supposing the Council to adjourn to Edinburgh quarterly—or even if a quorum of the London Board of Examiners were to go to Edinburgh four times in the year, to perform these duties—the travelling expenses would be considerably more than £200 per annum; and then they must have a place to meet in, with a museum for the examination of candidates in Materia Medica, and some person to take charge of the premises. The Examiners in Edinburgh had hitherto worked without fee, although he believed it had been intended that the Members of that Board should have the same fees as the Board in London. They had a small museum, which was improving by the liberality of local Members, and some duplicate specimens from the museum in London. They conducted the business of the Society in Edinburgh at a very moderate expense; and if the Society consulted its interest and character, they would send more specimens to the museum, and better specimens; so that in case any Members from a distance—from Dover, for example—should visit Edinburgh, and call to see the establishment, they might find something worth seeing. They had lectures in Edinburgh, and prizes were awarded to the most deserving pupils, some of whom had done much credit to the Society. The examinations in Scotland tended to promote the general objects. The Associations in Liverpool and Manchester were valuable coadjutors, and deserving of encouragement, as an act of grace; but the branch in Scotland was part and parcel of the Society, and entitled to support, without which it would be paralyzed, and the general interest of the Society sacrificed.

Mr. Woolley was surprised that any objections should have been raised against the small sums occasionally granted for local purposes, which were necessary for maintaining the general interest. The expense of the collectors was not confined to London. In Manchester it was his practice, as secretary, to receive such subscriptions as were paid early in the year; and when the time of registration was approaching, a collector was sent round to those who had not paid, and he received a per-centage.

Mr. Edwards (Liverpool) said a similar custom prevailed in Liverpool. Mr. Bottle's remarks appeared to be inconsistent with each other. While he desired to reduce the subscription of country Members, he objected to local grants. The Council, instead of diminishing the income, by reducing the subscription of the country Members to 15*s*., sent back a part of the amount received to places where they saw a nucleus of education and exertion in aid of the Society. It should be remembered that the current expenses were defrayed by local subscriptions.

Mr. Randal, jun. (Southampton), did not agree with the proposal to reduce the subscription of country Members. They had the Journal, which afforded some assistance in the improvement of education. If the London Members had some additional privileges, they had more work and responsibility. If they were to retire from their labours, the Society could not exist. He felt much indebted to the London Members. Although some of the remarks had been on small points, he did not regret the discussion, as everything had been fairly and satisfactorily explained.

Mr. Southall was of the same opinion. The Committees who performed most of the work consisted of London Members. He had heard no dissatisfaction about the subscription.

Mr. Macfarlane confirmed this remark. He had heard no complaints about the guinea subscription, but he had heard some Members complain of the reduction from two guineas to one before the funds of the Society had accumulated sufficiently to justify the change. The idea of a reduction to 15*s*. was ORIGINAL and UNIQUE, and he hoped it would remain so.

Mr. Peacock thought the London Members had not so much advantage as some persons supposed. Not half the number could attend the meetings on account of the late hours of business. If they would unanimously agree to close at eight or nine, they could attend more generally.

Mr. Jacob Bell said, if they waited for unanimity on the subject of early closing, they would never make any progress. He had found by experience that the best plan was to close earlier, and leave others to follow the example. He closed at eight, and finally at nine (except on Saturdays), and had suffered no inconvenience.

Mr. Pedler rose to move a resolution. He congratulated the Society on the able representative of the North British Branch, and hoped he would live many years to

aid the Council. The only way in which their body could be improved, was by extending education. The Society was not established for the sake of the Benevolent Fund, but to enable the Members to do without such a fund, or to raise one in case of unforeseen misfortune. On looking back at the state of the Chemists and Druggists fifteen years ago, every one must have observed a great improvement—thanks to the exertions of the Council. He was formerly on the Council, and knew that their labours were considerable. They had lately had unusual difficulties to contend with—he hoped these had come to an end, that unanimity would in future prevail, and that the opponent of the Society would become a useful Member ;—he moved,

"That a vote of thanks be given to the Council for their arduous and devoted attention to their duty as Councilmen during a year of unusual trouble and anxiety."

The resolution was seconded by Mr. PEACOCK, and carried unanimously.

The PRESIDENT acknowledged the vote on behalf of the Council.

Mr. E. BURDEN reverted to the subject of early closing. Although the Council could not legislate on it, a strong recommendation would have a good effect.

Mr. J. BELL remarked, that the Council had passed a resolution to that effect, which had been read at one of the evening meetings, and published in the Transactions.

Mr. FELLS moved, that a complete list of the Members, Associates, and Apprentices be published annually; and alluded to the lists published by the College of Surgeons and other Medical bodies.

After some discussion he modified his resolution as follows:—

"That it be recommended to the Council to take the following proposition into consideration. That an alphabetical List of the Members, Associates, and Apprentices of the Society, as well as of the honorary Members, and such persons as have passed the major and minor examinations, with their several addresses and dates of admission or examination, be printed and published for the information of the Members of the Society generally, and that a copy of the same be sent to every Member with the first number of the Journal that shall be issued after the completion of the said list."

Mr. GARLE seconded the resolution.

Mr. JACOB BELL remarked, that the cost of such a list amounted to above £50, and he thought it would be premature to publish it before the legal proceedings against the Society were finally concluded, as the right of several hundred of the Members to be on the list was the question in dispute. As soon as that question had been settled he should be glad to see a List of the Members published.

The resolution was carried unanimously.

Mr. COLLINS objected to the stars (*) on the voting papers distinguishing the Members of the retiring Council from other candidates. He observed, when a scrutineer, that the country votes turned the election, and as the country Members had no acquaintance generally with the new candidates, a majority voted for those who had the star, which almost ensured the re-election of Members of the former Council.

Mr. BASTICK also objected to the stars. The country Members had no means of knowing the merits of the candidates. Some attended regularly to their duties, others, probably, never came near the place. Yet all were thanked alike, and starred alike, and, as a matter of course, re-elected.

Mr. HUMPAGE suggested, that a return of the attendances of each Member would remove this objection.

Mr. HERRING thought the * an advantage. The Members must form a judgment as to those who ought to be re-elected. The Members generally attended well; there might be some exceptions. Mr. Bottle had alluded to a "fungus ;" there was no fungus, if there were anything it was a mistletoe, an emblem of harmony and goodwill. He hoped the Society would grow and increase in the esteem of the public.

Mr. LESCHER moved, "That in future the names of the Members attending the Council Meetings be published monthly in the Journal." He had always advocated such publication of the names, and if it had been done the Members in the country would have known who were the most attentive to their duties.

Mr. ALLCHIN seconded the motion.

Some difference of opinion having been expressed, Mr. PEACOCK observed, that the question before the meeting tended to disunity, and he doubted whether any good

could arise from it. The country Members might attend less frequently, but their services were no less useful than those of the London Members. The cause of complaint was that some Members continued on the Council for a long series of years. He thought some should go out annually, and be ineligible for a year or two.

Mr. PEDLER objected to the publication of the names of those present at each meeting; the Council should be considered as a whole, and its acts as the acts of the Council. It would be a mistake to criticise each act or motion with reference to the parties who happened to be present.

Mr. GILES thought it would be better to refer the subject to the Council for consideration.

Mr. WAUGH did not consider the star a privilege. It was no advantage to be on the Council. He had been in office and found much work, frequent attendance, a glass of water occasionally, and sometimes a vote of thanks. Many Members when proposed declined to serve, others consented, but were not desirous of being elected for any benefit to themselves.

Mr. WOOLLEY moved as an amendment, "That in the list of candidates for the Council which are issued in future, the number of attendances at the meetings of the Council of each existing Member be inserted opposite his name."

Mr. WILLIAM HOOPER seconded the amendment, which, after some further discussion, was carried.

It was moved by Mr. WAUGH, seconded by Mr. BOWER, and resolved, "That the attendances of Members on Committees be also inserted." It was understood that this resolution had reference to the London Members of Council.

Twelve Members having been appointed to act as Scrutineers, the Chairman adjourned the Meeting to Friday, the 18th instant, to receive the report of the names of the Council and Auditors.

ADJOURNED MEETING,

May 18th, 1855.

MR. DEANE, PRESIDENT, IN THE CHAIR.

MR. HUMPAGE, as Chairman of the Scrutineers, presented the following REPORT:—

We, the Scrutineers appointed at the Fourteenth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have duly examined the voting papers committed to us, and report the following results:—

Voting papers allowed 719
Disallowed for informality 28

The votes were given as follows:—

Morson	595	Edwards, J. B.	560	Watts	403	Hollier	262
Davenport ...	585	Woolley	505	Smeeton	373	Coleby	226
Deane	579	Giles	503	Smith	360	Thomas	203
Edwards, G....	573	Bucklee.....	466	Evans	345	Greenish	201
Southall	572	Lea	457	Allchin	307	Best	201
Squire	572	Waugh	429	Bolton	304	Peacock	165

The five Auditors were unanimously elected.

(Signed) BENJ. HUMPAGE, WM. DICKINSON, WM. BASTICK, T. H. BELL, JOHN BARNARD, T. H. HILLS, GEORGE Y. SHARPE, WM. WATTS, JNO. W. MASON, THOS. W. STONE, THOS. M. BALL, GEO. S. PEDLER

Moved by Mr. MORSON, seconded by Mr. BIRD—

Resolved, "That the Thanks of this Meeting be given to the Scrutineers for their services on this occasion."

The Chairman declared the COUNCIL for the ensuing twelve months to consist of the following Members of the Society:—

BELL, JACOB, 338, Oxford Street
BIRD, WILLIAM, 42, Castle Street, Oxford Street
BUCKLEE, WILLIAM H., 86, New Bond Street
DAVENPORT, JOHN T., 33, Great Russell Street, Bloomsbury
DEANE, HENRY, Clapham

EDWARDS, GEORGE, Spital Street, Dartford
EDWARDS, JOHN B., 42, Berry Street, Liverpool
GIFFORD, JOSEPH, 104, Strand
GILES, RICH. W., 52, Royal York Crescent, Clifton
HANBURY, DANIEL BELL, Plough Court, Lombard Street
HERRING, THOMAS, 40, Aldersgate Street
HOOPER, WILLIAM, 24, Great Russell Street, Covent Garden
LEA, JOHN W., 68, Broad Street, Worcester
MACFARLANE, JOHN F., North Bridge, Edinburgh
MORSON, THOMAS N. R., 19, Southampton Row
SMEETON, EDWARD, Commercial Street, Leeds
SOUTHALL, WILLIAM, 17, Bull Street, Birmingham
SQUIRE, PETER, 277, Oxford Street
WATTS, JOHN, 107, Edgware Road
WAUGH, GEORGE, 177, Regent Street
WOOLLEY, JAMES, 69, Market Street, Manchester

AUDITORS.

BAILEY, DELAMORE, J., 30, Conduit Street
BRADLEY, JOHN, 10, Pont Street, Pimlico
WARD, FRANCIS, Grosvenor Street, West
WATTS, WILLIAM M., 32, Whitecross Street
WRIGHT, WILLIAM V., Old Fish Street

Thanks were voted to the Chairman, and the Meeting dissolved.

LIVERPOOL CHEMISTS' ASSOCIATION.

MUSEUM OF MATERIA MEDICA.

WE omitted in our last number the report of a meeting held on the 30th of March, of which our space admits of a very short notice. The special purpose of the meeting was to discuss the necessary arrangements for the formation of a Museum, in accordance with the resolutions unanimously passed by the Committee, and published in our number for April, page 453.

Mr. Abraham was called to the chair, and the proceedings commenced with an address by Dr. Nevins, "On the Importance of an intimate Acquaintance with Materia Medica on the part of the Pharmaceutical Chemist, and the Advantages to be derived from a complete and well-arranged Museum of Specimens in the Study of that subject."

Dr. NEVINS commenced by alluding to the difficulty of arguing with a meeting which he knew to be unanimous. He had nothing left but to offer a few suggestions as to the mode of carrying into effect that which they all desired. After a brief notice of the museum of Cuvier, and some other museums, he made some practical remarks on the classification of specimens, and the mode in which a museum may be made most useful as a dictionary for reference. He also laid much stress on the value of a correct and well-arranged catalogue, and concluded by the expression of favourable anticipations of success in the undertaking.

Mr. THOS. D. WALKER, at the request of the Chairman, gave a short account of the proceedings of the Council in reference to the Museum; and, in order to elicit the opinion of the Meeting, he moved—

"That this meeting concurs in the resolutions of the Council respecting the formation of a Museum of Materia Medica, and the members present pledge themselves to support this object to the utmost of their ability."

Dr. EDWARDS seconded the resolution, which, after some remarks from Dr. Dickinson, Mr. Mercer, Mr. Jackson, and other gentlemen, was carried unanimously.

Mr. WRIGHT moved, and Dr. EDWARDS seconded, a vote of thanks to Dr. Nevins, for his excellent and interesting address, which was carried unanimously.

The SECRETARY announced the following presentations of books:—The Literary and Philosophical Society's Transactions, with their Laws and List of Members, 5 vols., by the Society; Pharmacopœia Londinensis, 1851; Ainslie's Materia Indica, vol. 2, by Mr. T. B. Hardman; Phillips's Examination of the Pharmacopœia, by

Mr. T. D. Walker; Culpepper's Herbal, by Mr. Whittbread; Laws and List of Members of the Historic Society, by the Society.

The following is a list of Subscriptions to the Museum Fund of the Liverpool Chemists' Association :—

	£	s.	d.
The Pharmaceutical Society of Great Britain	50	0	0
Mr. Robert Clay	5	0	0
Mr. Edward Evans	5	0	0
Messrs. Raimes and Co.	3	3	0
Mr. J. Abraham	2	2	0
Mr. Jacob Bell	2	2	0
Joseph Dickinson, M.D., F.R.S., &c.	2	2	0
Mr. H. S. Evans, F.C.S.	2	2	0
Messrs. J. H. and S. Johnson	2	2	0
Mr. R. Sumner	2	2	0
Mr. H. S. Alpass	1	1	0
Messrs. G. Bramwell and Son	1	1	0
Mr. H. Coupland	1	1	0
Mr. F. Cundill	1	1	0
Mr. J. Dutton	1	1	0
J. B. Edwards, Ph.D., F.C.S.	1	1	0
Mr. G. Hamilton, F.C.S.	1	1	0
Messrs. J. J. Jackson and Co.	1	1	0
Mr. E. Jardine	1	1	0
Mr. W. W. King, London	1	1	0
Messrs. Meggeson and Co., London	1	1	0
Mr. N. Mercer	1	1	0
J. B. Nevins, M.D.	1	1	0
Messrs. E. Pearson and Son	1	1	0
Mr. W. Rawle	1	1	0
Mr. A. Redford	1	1	0
Messrs. Roberts and Butler	1	1	0
Mr. C. W. Shaw	1	1	0
Mr. T. D. Walker	1	1	0
Mr. G. Willings	1	1	0
Mr. W. Wright	1	1	0
Messrs. Fearnall and Co.	0	10	6
Mr. W. Guy	0	10	6
Mr. R. W. Holt	0	10	6
Mr. W. Lawson	0	10	6
Mr. W. Townson	0	10	6
Mr. Thomas Vose	0	10	6
Mr. T. L. Watson	0	10	6
Mr. W. Whittbread	0	10	6

MEETING.

The usual Pharmaceutical meeting was held at the Royal Institution on Friday evening, March 27th, when Mr. H. S. Evans, F.C.S., read a paper (being the fourth of the series commenced last session) on "The Application of Histology, or the Science of Tissues, to Pharmacy."

The articles noticed in this paper were saffron, cloves, nutmegs, mace, pepper, colocynth, lobelia, linseed, mustard, coffee, and chicory.

The microscopic and other characteristics of these substances, and of their various adulterations, were given at considerable length, and were well illustrated by a large number of valuable diagrams.

A letter was read from Mr. G. Hamilton, F.C.S., drawing the attention of members to the fact that in a sample of what had been sold to him as "pure glycerine," he had detected a considerable quantity of lead, and pointing out the importance of ascertaining its freedom from this impurity previous to its employment as an internal remedy, which was now becoming general.

THE MANCHESTER PHARMACEUTICAL ASSOCIATION.

Two Societies—The Chemists' Conversational Society, and The Chemists and Druggists' Institute—having been established in Manchester, for the purpose of promoting a more scientific education amongst the junior Members of the Pharmaceutical body, and of providing opportunities of acquiring instruction by means of Lectures, and Meetings at which papers on subjects relating to practical Pharmacy were read and discussed, it was felt that a cordial union of the two Societies would more effectually accomplish the objects in view than their divided efforts had hitherto been able to do.

The Members of both Societies being desirous that a union should be effected, a sub-committee was appointed from each Society to meet and consider the best means of arriving at this desirable result. After the matter had been fully discussed, it was resolved that the two Societies should be dissolved, and a general meeting of the Members held to institute a new Society.

In accordance with this resolution, a meeting was held at the Mechanics' Institution, Cooper Street, on Wednesday, May 2nd, at which there was a very full attendance of the Members of both Societies.

On the motion of Mr. J. Taylor, seconded by Mr. H. Peatson, Mr. W. R. Brown was unanimously called to the Chair.

In a brief address he stated the objects for which the meeting was convened, and showed the necessity there existed for improved means of education for the junior Members of the body, and the duty of Principals to supply it. Mr. Woolley urged the importance to the young men of their availing themselves of the opportunities afforded for acquiring the knowledge so necessary to enable them to pass the

examination of the Pharmaceutical Society, which it is daily becoming more essential to their future success, either as Principals or Assistants, that they should do. Mr. J. Taylor and Mr. Roberton also addressed the meeting, stating the objects of the Society, and urging the Members of the trade to give it their cordial support.

The following Resolutions were passed unanimously :—

Moved by Mr. J. Woolley, seconded by Mr. W. Race:—"That the Society now formed shall be called 'The Manchester Pharmaceutical Association.'"

Moved by Mr. J. Roberton, seconded by Mr. J. Taylor:—"That the objects of the Society shall be to carry out a scheme of education for the Pupils and Assistants of Manchester and the neighbourhood, and to promote the cultivation of Pharmaceutical knowledge amongst its Members."

Moved by Mr. Holyoake, seconded by Mr. Wylde :—"That the subscription to the Society shall be 10*s.* 6*d.* per annum."

Moved by Mr. Ransome, seconded by Mr. Garlick :—"That the officers of the Society shall consist of a President, Vice-President, Treasurer, Secretary, and six Members of the Society ; the whole of whom shall form an executive committee."

Moved by Mr. W. Wilkinson, seconded by Mr. Mitchell :—"That there shall be annually an aggregate meeting of the Members of the Society, when the accounts of the past year, and a report of the Society's transactions, shall be submitted, and the periodical meetings of the executive council fixed."

The officers of the Society for the ensuing year were then elected, and the following gentlemen unanimously chosen :—President, Mr. J. Woolley; Vice-President, Mr. Ransome ; Treasurer, Mr. Lynch ; Auditors, Mr. John Wylde and Mr. Peatson. Committee : Mr. Standring, Mr. Race, Mr. Taylor, Mr. Roberton, Mr. Brown, and Mr. Greenough.

A vote of thanks was proposed to the Chairman, and the meeting then terminated.

MEETING OF THE EXECUTIVE COMMITTEE.

At a meeting of the Committee, held May 8th, it was moved by Mr. Brown, seconded by Mr. Taylor :—"That the meetings of the Society be open to the Assistants and Apprentices of the Members, and that Members have the power of introducing visitors."

Moved by Mr. Taylor, seconded by Mr. Ransome :—"That Mr. W. Wilkinson be requested to accept the office of Honorary Secretary, and that the President be deputed to wait on him with that request."

A course of Lectures on Botany to the Members and Students of the Manchester Pharmaceutical Association, was commenced on Friday morning, May 11th, by Mr. Grindon, Botanical Lecturer to the Pine Street Medical School; and a course on Materia Medica, on Wednesday, the 16th, by Mr. Somers, Lecturer to the Chatham Street Medical School, both of which are attended by a large number of Students.

We have been favoured by Mr. Hamer, Hon. Secretary of the late Chemists and Druggists' Institute, with the following ABSTRACT of

THE INTRODUCTORY LECTURE,

BY MR. SOMERS.

"What's in a name ?
A rose by any other name
Would smell as sweet."

So said the poet, and so say I, for when I look around me and see the number of old familiar faces, and on the other hand the number of new ones, it reminds me of the fact that the Chemists and Druggists' Institute exists no longer, but is defunct in name only. Last year I had the honour of giving you a course of lectures on Materia Medica, and during the winter my friend and colleague, Mr. Stone, has, with his usual ability, delivered to you a course on Chemistry.

During the time that I addressed you, the two rival societies existed with the praiseworthy exertions of the gentlemen connected with them; since then the two societies have united as one under the name of the Manchester Pharmaceutical Association. I look upon the union of the two societies as an event of mighty

mportance, for other towns will follow your example, and the various branches of knowledge in Chemistry, Materia Medica, and Pharmacy will become general.

A mere Druggist, or one who vends drugs *without* knowing the nature of them, is possessed of little or no *merit;* but a *Druggist* who is a *Chemist* is one who is possessed of real and scientific knowledge, which it is your present laudable ambition to attain. The lecturer here made a few passing remarks on Homœopathy.

The most permanent doctrine of Homœopathy is infinitesimal doses. Hahnneman, in one part of his Organum, directs us to take two drops of a certain expressed juice, and add to it ninety-eight drops of alcohol, this is to be shaken twice, and labelled number one ; two drops of number one are added to ninety-eight drops of alcohol, shaken as before, and labelled number two ; the same treatment is followed with number three, and so on until it has reached number thirty,—and according to his theory it will then have received more potency and power from the number of shakes it has received than the mixture in the phial labelled as number one. At first he stated that the phials were to be shaken ten times, but not being able to reconcile his own conscience with the absurdity of these Pharmaceutical gymnastics, he decreased the number to two. Here the lecturer facetiously remarked that if we were to take two drops of the mixture labelled number thirty, and place them in the Atlantic Ocean, say from the Irish Coasts, it would no doubt by the time it had reached its opposite American shore have acquired a degree of potency and power quite incomprehensible for any one to fathom. This, gentlemen, is utterly absurd, and as may be observed with very little reflection has nothing in it of reason to sustain it, and is quite without the bounds of analysis. I ventured to express in an introductory lecture at the Chatham Street School of Medicine my views of the primary cause of the partial success of Homœopathy, and this cause I classed under the three following heads:—First, the gullibility of the public ; second, the incompetency of Druggists ; third, the adulteration of drugs. But a new and brighter era glimmers in the future. The Chemists and Druggists will become competent and well educated, Physicians will place more confidence in them, adulterated drugs will be exterminated from the market, and then Homœopathy will sink to the ground.

With reference to the more immediate subject of the lecture, the lecturer proceeded to observe that the study of the nature and properties of drugs, with a view of applying them to the cure of diseases, was coeval with our race ; for when man was driven forth from Paradise he was compelled to learn the nature of drugs by experiments upon himself, and he discovered that certain drugs in various doses had various effects. At a time when the system was unvitiated by the effects of intemperance—the air uncontaminated by anything prejudicial to health, but pure as a river at its source—it is no matter of wonder to us that man at that time attained such a remarkable longevity. Those who had only few diseases knew only the property of a few drugs ; but as mankind increased, the diseases of men increased with them, and the knowledge of drugs became more general. The juice of the hemlock or the root of gentian would have the same effect now as it had in the time of Socrates. Chemistry has made us acquainted with more remedies—it has served to strengthen our faith in the remedies employed by our forefathers. They found that the excrement of various animals were useful in many diseases. This, in our view, not very long since, was disgusting and revolting ; but the science of Chemistry had taught us that they contained ammonia, which we now use for the same purpose as they did. Again, they used crabs' eyes as antacids, but we now reject them, and use chalk, &c., instead ; and iodine has superseded the use of burnt sponge.

In conclusion, the lecturer announced that the subject of next week's lecture would be—Water, Baths, and Mineral Springs.

ORIGINAL AND EXTRACTED ARTICLES.

CULTURE OF COCHINEAL IN THE CANARY ISLANDS.

BY DR. THEODOR MARTIUS.

This costly colouring material, which was formerly obtained solely from Mexico, has, during the last thirty years, become an object of artificial culture. This has given rise to the introduction into commerce of cochineal from Teneriffe, Algeria, and it is probable that it will soon be obtained from the East Indies.

The accounts of the collection and preparation of cochineal are at present very contradictory, and the circumstance that *black* and *silver* cochineal are met with, has especially given rise to very discrepant views.

During the last two years Teneriffe cochineal has come into considerable competition with Honduras cochineal, and it would appear from the following statements more correct to consider this kind of cochineal as the produce of the Canaries. In a very interesting work by Dr. Julius Freiheron von Minutoli,* it is shown that in the year 1853 the culture of cochineal was carried on in the following of the seven inhabited Canary Islands :—

1. Teneriffe.—The author states that the *niguera chucaba* or *tunera* grows remarkably well on this island.

2. Fuerteventura likewise appears to be situated very favourably for the culture of nopal.

3. Lanzaroti.—Here the culture of the cactus is very extended. It grows with great luxuriance and rapidity, and the culture of cochineal is carried on with great success.

4. Gomera.—Here the attempts to establish this industry have been less successful.

It is likewise stated that the Indian fig grows well upon Gran Canaria, but no mention is made of the culture of cochineal there.

In Palma, the sixth island, the production of silk appears to be more extensively carried on ; and in Hieroo, the deficiency of springs may render the culture of the cochineal insect or of cactus impossible.

It is also stated that there are in the Canaries three concentric zones. The first, *costa*, extends about a league from the coast inland, becomes wider when the surface is even, narrower where it is hilly. The intermediate zone, *mediania*, extends as far as the foot of the mountains in the centre of the islands, and the *cumbres* comprise the mountainous districts.

These remarks are necessary, in order to render what follows intelligible; and it may be added that it is D. Santiago de la Cruz who has, with much trouble, introduced the culture of cochineal into the Canaries.

There are several species of *nopal*, *la tunera silvestre* Indian fig, *cactus tuna*, short leaf with numerous thorns, serves only for colouring sugar, fruit, and wafers ; and *la tunera amarilla*, with large, yellow, sweet fruit, and round green leaves. The *tunera blanca* is best adapted for the culture of cochineal ; but it is inconvenient, on account of its numerous thorns. Lastly, there is a Mexican species with very soft thorns, which is likewise available for cochineal culture.

In planting the nopal, land must be selected which is exposed to the sun and sheltered from wind, so that the insects may not be blown off the leaves. The soil must not be close and clayey, but light and porous; so that the roots may easily penetrate downwards, and the moisture be retained within it. The soil may be stony, and the plants may even be set upon the bare rock, if there are fissures into which the roots can penetrate. When they are planted upon the plain, the soil must be ploughed up at least a foot and a half deep. The plants are set in the furrows at six feet distance from each other, and with sufficient watering they soon spread out.

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* *El Pasado y Provenir de las Islas Canarias.* Berlin, 1854.

In the autumn, strong nopal stems, with large, thick and thorny leaves, are selected. They must be more than a year old; and when they are to be planted in good land, each one must have at least two or three leaves developed. In inferior land one leaf is considered sufficient. The plants are broken off by the hand, and are exposed to the air for eight or ten days, in order that they may cicatrize; and during this period they must be frequently turned over. If they were planted at once they would die. A hole is made in the furrow, the plant stuck in so that it is turned towards the light, and that the wind and rain may strike the leaves only on one side. The lower end of the plant is covered with earth, and, according to the richness of the soil, the plants are set at a foot and a half or six feet apart. When the land in which the plants are set can be irrigated, this may be done about twenty or twenty-five days after setting them. When the weather is dry the watering is repeated at the end of a month. However, the water must not come in contact with the plant, but be led along between the furrows. From 2800 to 3200 plants of nopal are set upon half an acre of land. In December the soil is removed from the plants to admit more freely the access of air, but care must be taken not to go so deep as to injure the roots. At the same time weeds should be removed and manure applied. For this purpose pigeon dung is preferred, and in the absence of it well rotted pig or cow dung. The nopal plants in dry soil only require manuring every third or fourth year. In the spring the soil round the plants is again carefully cleared of weeds, the cobwebs removed from the plants, and a close search is made for an insect which burrows in the leaves or stem. This insect has a form very similar to the cochineal, and is called *cochinella bastarda*. It is very detrimental to the plants, and if not removed would cause them to die. Constant attention to the plants is indispensable. They require to be watered only when there is no rain, and then not more than every fortieth or fiftieth day. Too much moisture makes the fleshy leaves dry, hard, and yellow. As soon as the new leaves shoot out, the fruit buds are formed, and in order that the plants may not be deprived of too much sap, these are carefully removed. They are distinguished from the flattened shoot of the young leaves by their round form.

The cochineal insect should only be placed upon plants three or four years old. During the first year potatoes or barley may be grown in the spaces between the furrows, but afterwards this must be discontinued, so as not to interfere with the roots of the nopal.

In autumn the yellow leaves are removed. Good nopal serves for twelve or fourteen years for the culture of cochineal. In the months of March, April, or May, according to the season, the young broods are placed upon the leaves. In warm weather, they are hatched on the seventy-fifth or ninetieth day; in cold weather, ninety-three or one hundred and thirteen days are requisite. Those who are experienced in the matter, believe they can predict the day that the young brood will be hatched. So soon as they begin to move, the mother-insects are carefully collected and spread out about an inch apart on boards or in boxes. The cochineal are covered with rags an inch wide, and four or five inches long. These rags must not be larger, because when the leaves are over-loaded with insects, they remain small and weak. Moreover, the females are then less productive, the leaves are consumed more rapidly, and the expenses proportionately increased. The rags are removed from the cochineal daily, or even more frequently, and when they are sufficiently covered with the young insects, they are carried in a basket to the nopal, each rag laid upon a leaf, and fastened with the thorns. After a few days, when the insects have spread themselves over the leaf, the rags are removed. The opinion that it is better not to place the insects upon the plants for at least six days, appears to be simply founded on prejudice, and is not confirmed by experiment.

Instead of the rags, small bags of muslin are sometimes used; a number of

mother-insects are placed in each bag, which is hung upon the nopal leaves until the young are hatched, and the insects have crawled up on the leaves. Many insects are lost in this way, and it has also the inconvenience that the whole brood comes upon one part of the leaf, and their development is retarded.

When the young are hatched, the mother-insects which appear to be wholly exhausted, are collected and killed. These yield the finest and most valuable cochineal, *mother cochineal*, which when dried is quite black. It is known in commerce under the name of *black cochineal*, *cochineal renigrida*, *grana nigra*, and the pound costs eighteen reals.

It must not be forgotten, that the more leafy the nopal is, the less the insects like it, and for this reason the plants are allowed, just before putting out the young insects, to fade slightly, and are then watered some time afterwards to revive them. The insects become full-grown in fifty or sixty days. The males are very small, dirty-white, and winged; they die immediately after the impregnation of the females. The form of the latter is that of an ellipse divided lengthways, they are from three to four lines in length. The insects remain upon the same spot of the leaves after once settling, and when once removed, they are unable to attach themselves again either there or elsewhere.

In from sixty-five to one hundred and fifteen days, the breeding time of the new generation comes on, and the insects are removed to make place for the succeeding young ones. This is done with a broad knife with rounded end, and a piece of metal attached covering two-thirds of the convex surface, and attached to the handle, which extends a foot and a half in a tongue shape, so that the insects, when removed, fall into the hollow. The insects are detached from the leaf by the tongue-shaped handle, and swept off by the knife into a tin box held in the left hand. It is about five or six inches deep, triangular, and furnished with a handle at one side.

As the value of the cochineal depends upon the size of the insects, the largest are gathered first, and in this way an opportunity is provided for the remaining ones to become larger. The breeding insects are collected from among the larger ones. Their collection requires great dexterity and quickness.

The insects collected are killed daily, and for this purpose they are spread out in layers about an inch deep, upon trays of tin or clay, which are placed in an oven heated to 131° F. Great care must be taken not to burn the insects, or allow them to adhere to the bottom of the tray. When they are all dead, they are put into boxes and exposed to the sun until perfectly dry, and care must be taken that they do not become mouldy. A more simple way of killing the insects, is to fill clay boxes holding about twelve pounds, and close them tightly for twenty-four hours. Twice the time is requisite when the boxes are smaller or only half-filled. The only objection to this method is, that the drying is difficult and tedious, requiring artificial heat.

Three pounds and a quarter of living insects yield one pound of cochineal. Before being sold, it is sifted through a hair sieve in order to remove the small white pollen (?) which adheres to them. Nevertheless, the insects are whitish-grey when dry, so that they are known in commerce by the name of *silver cochineal*, *cochinella jaspeda*. The pound costs sixteen reals.

The productiveness of these insects is very great. The mother-insects are kept in the boxes fourteen or twenty-one days, and the rags are removed full of young once or twice daily, so that the number of young that a female may produce during twenty-four days and without food, amounts to a million.

The Canary cochineal is the next best to the Honduras. Women are exclusively engaged in attending to the cochineal culture. When the season admits of breeding the insects early, the second brood is placed on the leaves immediately after the first. When the winter rains are late, a third crop may be collected, at least in the coast district, for there the insects do not die in December, as they do in the colder regions of the mediania.

The nopal must be kept free from rats and lizards, as well as birds.* The produce of an acre of good land planted with nopal, amounts annually to 500 pounds of dry cochineal. In dry land, the crop varies between 50 and 500 pounds.

It would be very serviceable to preserve the insects through the winter in the mediania district, and thus remove the necessity of bringing mother-insects every year from the coast district. Such a protection might be easily effected, by covering the nopal fields with a cane roofing. The following table shows the increased produce and exportation of cochineal from the Canaries:—

Years.	Pounds.	Years.	Pounds.
1831	7½	1843	74,964
1832	118	1844	88,294
1833	1,060	1845	168,109
1834	1,752	1846	232,550
1835	4,561	1847	296,292
1836	5,966	1848	375,585
1837	7,001	1849	449,757
1838	23,112	1850	782,670
1839	27,661	1851	368,109
1840	66,521	1852	806,254
1841	90,919	1853 In January	120,499
1842	69,116	1853 In February	111,331

Thus in the year 1853, the exportation would probably amount to 1,300,000 pounds, and the value of this, since the increased price consequent on the failure of crops in Honduras, would be £225,000.

Erlangen, April, 1855.

REPORT ON THE SUPPLY OF SPIRIT OF WINE FREE OF DUTY FOR USE IN THE ARTS AND MANUFACTURES,

Addressed to the Chairman of Inland Revenue.

BY PROFESSORS GRAHAM, HOFMANN, AND REDWOOD.

SIR,—We have now the honour to report on the practicability of supplying, for commercial purposes, a mixed spirit free from duty, without injury to the revenue, a subject proposed to us for investigation in your letter of March 25, in the following terms:

"The attention of Government has for some time been directed to the importance of allowing spirit of wine, free of duty, for use in the arts and manufactures. In order that such a privilege may be granted with safety to the revenue, it is absolutely necessary that means should be devised by which such spirit may first be rendered unfit for human consumption. It is also indispensable—1st. That spirit, after being thus treated, should still be so pure as to be generally available for the purposes to which it is to be applied in the arts or manufactures. 2nd. That it should not be capable of purification by any simple process of rectification or otherwise, so as to be made palatable by the addition of sweetening or flavouring ingredients.

"It is also highly desirable, that while the mixed spirit should be rendered as offensive as possible to the taste or smell, no decidedly poisonous properties should be communicated.

"Some preliminary inquiries have already been made into this subject. Mr. Phillips, one of our surveying-general examiners, has suggested a substance to be mixed in certain proportions with spirit which would interfere very little

* Fowls are very fond of the cochineal insects, and find out the plantations very readily. To prevent their depredations, the inhabitants, who are compelled to feed the fowls of the nobility, tie them by the leg during the day.

with its use in the arts, while it would render it highly unpalatable although not unwholesome. Dr. Hofmann, as you are aware, has made a number of experiments on spirits mixed in the manner suggested, and obtained very promising results. It is therefore desirable that the subject should be more fully investigated.

"With this view, your attention is directed to the points already indicated—viz.,

"Whether, and by what means, spirit produced in the ordinary mode can be rendered so offensive to the taste or smell, as to make it unfit for human consumption as a beverage, without materially impairing it, either for the manufacture of ethers, or as a solvent of gum resins, or for any of the purposes in the arts to which it is usually applied?

"Whether, and to what extent, the mixed spirit would resist any process for its purification, or might be so compounded as to make it palatable?

"To what branches of the arts or manufactures it would be safe or desirable to limit the privilege of using such mixed spirit?

"In what manner, under what superintendence, and with what precautions, the spirit should be mixed?

"The Board will also be glad to hear any suggestions of a practical nature, although not falling within the scope of this commission, which may occur to you in the course of your investigation."

Of the volatile substances which first suggested themselves as proper to be added to alcohol, in order to attain the object proposed, the greater number were soon eliminated as unsuitable upon a close consideration or actual trial of their properties.

Sulphide of ethyl and volatile sulphur compounds analogous to it, communicate their repulsive taste and odour when they are added to alcohol, even in a proportion so minute as 1 to 100,000; and are not removed from the alcohol by rectification or filtration through charcoal. But the sulphide of ethyl was easily separated from the alcohol by means of distillation after the addition of a little alkali, which is conclusive against its use.

The neutral volatile oils or essences are too easily removed from alcohol by means of dilution with water and distillation. The same objection applies to ordinary ether and to the compound ethers of all classes; the compound ethers being further readily decomposed by distillation with an alkali.

The mixed oils, procured from wood and various other organic substances by the agency of destructive distillation, promised better results. The liquid distilled from caoutchouc, and known as *Caoutchicene*, which is distinguished by a powerful and highly characteristic odour, has the advantage of being composed entirely of neutral hydrocarbons, and is therefore not liable to be acted upon by either acids or alkalies. These hydrocarbons are also of various degrees of volatility, some of them boiling at a lower and some at a higher point than alcohol itself, which must increase the difficulty of their separation from alcohol by the process of rectification. For experiments in mixing, caoutchicene was prepared by distilling caoutchouc in a glass retort by a heat gradually rising to redness. The oil was redistilled till its temperature of ebullition rose to 25° centigrade, and the portion which came over below that temperature, amounting to about three-fifths of the original distillate, was alone employed. The caoutchicene so prepared, when mixed with a large proportion of alcohol, evaporates completely in air, and when used as a solvent of resins, leaves on drying an inodorous varnish.

The proportion of caoutchicene which it was found most advantageous to use, was one part to 400 parts of strong alcohol, or 0.25 per cent. of caoutchicene. The spirit used in all the experiments to be described was of specific gravity 0.828. Such a mixed spirit becomes milky and opaque when diluted with water, but it is remarkable that the caoutchicene exhibits no disposition to

separate as an oil and come to the top, even when allowed to stand at rest for many days. Nor was the oil removed from the diluted mixture by agitation with the solvents of caoutchicene, such as benzole and colza oil. Filtration of the diluted mixture through wood charcoal removes the oil in part, but the caoutchicene odour remains seemingly unreduced in intensity. This mixed spirit, when distilled with one-eighth of its weight of potash, still retained the taste and odour of caoutchicene unaltered. When distilled with the same proportion of sulphuric acid the odour of the mixed spirit was slightly modified, but still remained very decided. The odour of caoutchicene was not removed from the mixed spirit by chlorine.

500 measures of this mixed spirit were diluted with 250 measures of water, which produced turbidity, and distilled by a water-bath. The distillate first collected, amounting to 166 measures, was of specific gravity 0.869; it became turbid by water, had the rank odour of caoutchicene, and was quite unpotable. The second portion of the distillate, amounting to 380 measures, of sp. gr. 0.888, was less offensive, but its odour was still peculiar and disagreeable; the taste of caoutchicene was also sensible and persistent. This distillate became milky with water, and the odour was then more repulsive. The third portion of the distillate, which contained all that remained of the alcohol, amounted to 62 measures, of sp. gr. 0.955. It was turbid, from the more fixed oils having distilled over, and possessed the strong rank taste and odour of caoutchicene.

The second distillate described above as amounting to 380 measures, of sp. gr. 0.888, was again diluted with half its bulk of water, and redistilled at 212°. The first portion of distillate, amounting to 166 measures, of sp. gr. 0.893, became very turbid with water, and had a highly decided odour and flavour of caoutchicene, becoming insupportable on the tongue after evaporation of the alcohol. The second portion of the distillate, amounting to 177 measures, of sp. gr. 0.930, was still decidedly marked by the odour of caoutchicene, particularly on dilution, when it became only slightly opalescent. This, which was the most highly purified portion of the distillate, was evidently a spirit which would not be saleable as a beverage.

In another experiment 500 measures of the mixed spirit containing caoutchicene were first distilled, and 420 measures drawn off. This distillate became turbid with water and had the offensive odour of caoutchicene. Mixed with half its bulk of water the liquid was redistilled and three fractions collected. The first distillate, amounting to 182 measures, of sp. gr. 0.875, became milky with water, and retained the repulsive odour and taste of caoutchicene in a striking degree of intensity. The second fraction, amounting to 297 measures, of sp. gr. 0.905, became opalescent with water, and had a distinct odour, not very unpleasant, and a taste allied to that of a minthy essential oil. The odour and taste became more highly marked on the addition of water. The third distillate, amounting to 288 measures, of density 0.987 and very aqueous, was offensive in taste and odour.

The second fraction above, which was the most highly purified portion of the liquid, was itself submitted to a new distillation, and brought over in three portions of sp. gr. 0.865, 0.866, and 0.905 respectively. All of them retained a decided taste and odour of caoutchicene.

These experiments show that much of the caoutchicene in the mixed spirit can be separated by repeated distillations, but that a portion adheres to the alcohol with considerable pertinacity. Enough of the caoutchicene appears to be retained, in all circumstances, to render the alcohol unpalatable as a beverage. On the other hand, the intense and disagreeable odour of spirit so mixed would considerably limit its applications. The odour would not be tolerated in dwelling-houses, nor in shops and warehouses frequented by the public, and the use of the mixed spirit would probably therefore be confined to manufactories.

Our attention had been particularly directed to wood-naphtha (crude pyroxylic

or methylic spirit) as the substance to be added to alcohol, by the previous experiments of Mr. G. Phillips and of Dr. Hofmann on the use of that liquid. The application of crude wood-naphtha depends partly upon the empyreumatic oils which it contains, and partly upon the methylic spirit and other substances miscible with water, which constitute the mass of the liquid. It was necessary to examine separately the influence of these two classes of constituents, and first, of the empyreumatic oils.

In one series of experiments, a specimen of the oils which had been separated from wood-spirit in the process of purifying that liquid, was used as the flavouring substance. Two per cent. of these oils were dissolved in spirit of wine. This mixed spirit had the strong characteristic odour of crude wood-naphtha, became milky when mixed with water, and was highly unpalatable.

When this mixed spirit, without any addition, was simply distilled by the heat of a water-bath, a small quantity of a dark-brown tarry matter was left behind in the retort, and the proportion of oils in the distilled spirit was greatly reduced. This mixed spirit appeared to be further purified when distilled from anhydrous sulphate of copper, from the protosulphate of iron, or from persulphate of iron. But none of these distillates was potable, and all became turbid with water. The flavour of the same mixed spirit was improved by distillation with one-eighth of its weight of sulphuric acid, but the liquid was still not potable. When the last distillate was again rectified from one-twentieth of its weight of potash, the rank odour of the oils disappeared in a great measure, the odour now retained resembling that of benzole. An attempt was made to remove the odour last described, by diluting the liquid with water, and passing it in the state of vapour over animal charcoal, but the liquid still retained the benzole odour, and was precipitated by water.

The greatest amount of purification was obtained by distillation from potash or lime, the alkali keeping back the creosote, but the mixed spirit still retained the tarry smell of benzole, and was turbid with water. When the mixed spirit so far purified by means of alkali was diluted with water, and again distilled, the first half of the new distillate was turbid with water, and even formed a layer of oil on the surface. But the second half of the distillate did not become turbid with water, showing that the benzole product comes off first. This last portion of the alcohol appearing to be restored to a fair degree of purity, it became doubtful whether much dependence could be placed upon the oils of wood-naphtha, for the purpose of mixing, apart from the methylic spirit of the naphtha. An experiment was made with pure benzole itself, mixed in the proportion of one part of benzole to ninety-nine parts of strong alcohol. A considerable portion of benzole was separated from this mixture by dilution with water, the benzole forming an oily film on the surface of the liquid. The liquid, however, continued milky and retained a strong odour of benzole. When this mixed spirit was diluted with three times its volume of water and slowly rectified, the first half of the distillate contained much benzole and became milky with water; while the second half of the distillate did not become turbid with water, and appeared to contain very little benzole. This result affords a very strong presumption that benzole is removable by rectification from alcohol when diluted with water.

Three additional and still more extensive series of experiments were made by means of different varieties of crude wood-naphtha, as this substance varies considerably in composition. Two of the varieties were procured from Messrs. Turnbull and Co., of Glasgow, one of which was described as "of full strength, but concentrated without destroying the oils;" the other described as taken "at an earlier stage of the process, half strength, and containing more oils than the last." The third material operated upon was the mixture of strong alcohol with five per cent. of crude naphtha, prepared at the laboratory of Inland Revenue, by Mr. Phillips. But after what has been already said it is unnecessary to enter into the details of these experiments, as the results were

similar to the first series. The oils were in a great measure removed from the mixed spirit by simple distillation, or by distillation from potash, and the distilled spirit was chiefly characterized by the taste and comparatively mild odour of methylic spirit or pure wood-spirit. The specimens became as little offensive as alcohol mixed with Turnbull's purified wood-naphtha; and there appeared, therefore, to be no great advantage in using the crude naphtha for mixing in preference to a purer wood-spirit. The question reduced itself to the applicability of pure wood-naphtha for the object in view.

The wood-naphtha hereafter used for mixing with alcohol was of the comparatively pure quality in which it is supplied to the public by Messrs. Turnbull and Co., at the price of 8*s.* 6*d.* per gallon. This wood-naphtha was nearly colourless; it mixed with water without becoming turbid in the least degree, and contained no more than a small trace of the oils which give a rank and repulsive odour to many specimens of wood-naphtha. The odour of this purified wood-naphtha was not disagreeable, although well marked and characteristic, being due principally to methylic spirit. The specific gravity of this naphtha was 0.815, and its boiling point 151° Fahr. When thoroughly dehydrated by being distilled three times from half its weight of anhydrous sulphate of copper, one gallon of the liquid gave by fractional distillation the following series of liquids, each amounting to about a pint:—

1st	distillate	of	sp. gr.	0.8067	; boiling point	143.6° Fahr.
2nd	"	"		0.8047	"	143.3° "
3rd	"	"		0.8031	"	146.5° "
4th	"	"		0.8028	"	146.5° "
5th	"	"		0.8016	"	148° "
6th	"	"		0.8008	"	150° "
7th	"	"		0.8009	"	151° "
8th	"	"		0.8015	"	151° "

Fractions 1 and 2 distilled again together from anhydrous sulphate of copper retained the low boiling point 143.5°, and had the mean density 0.8057, which is a liquid possessing the lowest boiling point that has been assigned to methylic spirit, but with a somewhat higher specific gravity, the specific gravity of pure methylic spirit being about 0.800. None of the fractional portions appears to be a single substance. The methylic spirit is probably accompanied in the earlier fractions with acetone of sp. gr. 0.792 and boiling at 132.8°, and acetate of methyl of sp. gr. 0.908 and boiling at 144°. While some third liquid, of which the nature is unknown, must be present to impart the high boiling point combined with a low specific gravity which distinguishes the later fractions of the distillate.

The presence of five per cent. of this purified wood-naphtha in strong alcohol, is easily recognized by its taste and odour, and is more than sufficient to render spirit unsaleable as a beverage, as has been ascertained upon good authority. At the same time the odour of the mixed spirit on evaporating in air is by no means offensive. In solvent power such a mixed spirit is indistinguishable from pure alcohol; and varnishes made by means of it dry readily and acquire no odour or peculiar character from the menstruum. Further, no practicable means of separating the methylic spirit again and recovering the spirit of wine in a state of purity and suitable as a beverage appear to exist; while the substance which destroys the potability of the mixed spirit, without impairing its value for many useful purposes, is not itself poisonous or unwholesome,—wood-naphtha, as is well known, having been used to some extent in medicine. The purified wood-naphtha appears indeed to be singularly well adapted for the preparation of a mixed spirit such as the Government desires to supply duty-free to manufacturers. At the same time a mixed spirit containing ten per cent. of the purified wood-naphtha appears to be preferable to a five per cent. mixture, from the greater facility of recognizing the wood-naphtha in the larger proportion, particularly when disguised by the presence of other volatile and odorous substances. A

ten per cent. mixture might therefore be issued in the first instance, and the proportion of wood-naphtha be reduced at a later period, if it was found that the change could be made with safety to the revenue. It is accordingly a ten per cent. mixture which we have had tested for the various useful applications of alcohol, because, if this mixture was found to meet the requirements of trade, the suitability for the same purposes of any mixture containing a less proportion of wood-naphtha might be safely assumed.

Although wood-naphtha (methylic spirit) and alcohol are of unequal volatility, there being a difference of about thirty degrees between their boiling points, yet no sensible separation of these liquids can be effected by distillation. Both the five and ten per cent. mixtures described were submitted to fractional distillation; but wood-naphtha was found in all the fractions. Even the last eighth portion of the five per cent. mixture, which was not distilled over, but was left behind in the retort, contained abundance of wood-naphtha, the more volatile constituent. In another experiment, to be described in the sequel, rectification repeated several times failed equally to eliminate the smallest portion of pure methylic spirit from the mixed spirit. The reason of this is that alcohol which boils at the higher temperature has a denser vapour than methylic spirit, in the proportion of 1.600 to 1.125. The less volume of alcohol vapour which distils over at the boiling point of the mixed spirit is compensated for by the greater weight of that vapour, so that the proportion between the constituents of the mixed spirit appears to be little if at all disturbed during the progress of the distillation.

The similarity in chemical constitution of methylic spirit and spirit of wine, both being alcohols, is attended with a remarkable analogy in properties between the two substances, which appears to render their separation by chemical means also a problem of great, if not insuperable, difficulty.

Methylic spirit forms a solid crystalline compound with chloride of calcium, a property which is taken advantage of in purifying methylic spirit for scientific purposes, from the other liquids by which it is accompanied in wood-naphtha. Our mixed spirit being first carefully dehydrated by means of sulphate of copper, and reduced to a specific gravity of 0.801, was then mixed with chloride of calcium in excess, so as to form a thin paste, and distilled by a water-bath heat. Methylic spirit was easily discernible by its odour in the distillate which came over; so that the presence of ordinary alcohol in a large relative proportion, appears to prevent the combination of methylic alcohol with chloride of calcium, or to decompose such a compound when formed: for ordinary alcohol, as well as methylic alcohol, has a considerable affinity for the salt in question. When water was subsequently added to the chloride of calcium nearly dry in the retort, and the heat renewed, a liquid came over which possessed a peculiar and disagreeable odour, but appeared to be chiefly composed of ordinary alcohol. This liquid should have been methylic spirit if the experiment of separation had been successful.

The attempt was also made to purify the alcohol of our mixed spirit from its accompanying methylic spirit, by passing the vapour of the two liquids through a long glass tube containing fragments of chloride of calcium, which was kept at a temperature of 212° during the experiment. No absorption, however, of the methylic spirit by the chloride of calcium occurred, but the salt remained unaltered, and the alcohol distilled over and condensed with its original proportion of methylic spirit.

Several experiments were also made on the oxidation of the mixed spirit by means of various proportions of the mixture of bichromate of potash and sulphuric acid, with the view of oxidizing and removing the methylic spirit, but without success. The oxidation products were acetic acid and formic acid, accompanied by much aldehyde, and indicated the decomposition of the alcohol as well as of the methylic spirit.

Sulphuric acid is very useful for discovering the presence of common alcohol when mixed with wood-spirit, from the ready production of ordinary sulphuric

ether. But for the converse problem of separating a small proportion of wood-spirit from a large proportion of alcohol, sulphuric acid appeared to be wholly inapplicable.

Oxalic acid employed to etherize the mixed spirit seemed at first to promise better results, as the methylic oxalic ether appeared to form more easily than the corresponding ethylic ether. After the cohobation of the dehydrated mixed spirit with oxalic acid for several hours, the liquid which came over on distilling was alcohol with the proportion of methylic spirit apparently considerably reduced. This alcohol always contained portions of the oxalic ethers, and was liable to become acid from the gradual decomposition of these ethers. The flavour of the methylic spirit, which is at first covered by the rum-like flavour of these ethers, would no doubt come out with time, and prove, as usual, highly disagreeable. No economical process for the purification of the mixed spirit could, we believe, be founded on the action of oxalic acid.

The conclusion from much investigation is, that the removal of wood-naphtha from the ten per cent. mixed spirit, and the restoration of its potability by any simple and economical process, is a most unlikely occurrence. We apprehend no danger whatever to the revenue from this source. The mixture of spirit of wine with ten per cent. of purified wood-naphtha or methylic spirit, which we recommend, may be designated *methylated spirit* for convenience.

The quantity of wood-naphtha which can be commanded appears to be amply sufficient for the new contemplated application of that substance. We are indebted to Mr. John Turnbull for his valuable opinion on this point. "My calculation regarding wood-spirit," that gentleman states, "is a produce of two gallons and a half from a ton of average dry wood, and the production of the United Kingdom amounts annually to 66,000 gallons. This I take as the proceeds of nineteen manufacturers of pyroligneous acid; although you must receive it as a rough guess, still I believe it is not very far from the truth." Much wood-naphtha is also attracted to this country from the Continent, owing to the high price which that liquid obtains here as a substitute for alcohol.

We have been favoured with the opinion of Mr. G. Smith, of Whitechapel, one of the most extensive London distillers, on the application of our methylated spirit as a beverage. He pronounces the methylated spirit to be quite unfit for the use of the rectifier. He believes also that publicans would never use such a spirit for mixing with their liquors, even in a small proportion. A mixture of gin with one-eighth part of the methylated spirit, was found to be nauseous and unpalatable. In gin mixed with one sixteenth of methylated spirit, the flavour of the latter was still very strongly marked. In gin with one part of methylated spirit in thirty-two, the flavour of the methylic spirit became faint, but it was still perceptible in a mixture of one to sixty-four. The largest proportion of the methylated spirit which it was thought a publican might venture upon adding to his gin was one in thirty-two. Now, the saving to him would be the same fraction of the spirit duty, or proportion of 6*s.* 2*d.* per gallon, the duty on spirits of the strength of gin—that is, a profit of $2\frac{1}{4}d.$ per gallon. So small a profit would be no compensation for the deterioration in the quality of the gin. The disagreeable odour of the methylic spirit is brought out strongly on mixing the gin with hot water.

The consumption of sweetened and highly-flavoured cordials appears to be greatly inferior to that of gin; a publican in large business, who may retail 1200 gallons of gin per month, not disposing of more than ten or twelve gallons of cordials in the same time. The substances chiefly used in flavouring cordials are carraway, cloves, and aniseed. The methylated spirit could not be used for any of these liquors. Indeed, from their being generally made use of to give an extempore flavour to gin at the option of the customer, more than usual attention must be paid to their own purity of flavour.

The flavour of brandy is a great deal too delicate to be tampered with, by the addition of the smallest proportion of methylated spirit. The addition of the

latter substance to whisky would require to be guarded against, from the predilection of the consumers of that spirit for a smoky flavour. An experiment has been related to us in which methylic spirit was employed for the sake of its flavour by a Scotch distiller, and mixed with spirits in the minute proportion of one gallon to 1000 gallons. The flavour, although not objected to in the whisky, when newly mixed, became rank and disagreeable in the course of two months. The mixing of methylated spirit with that low quality of rum known as Leeward Islands rum, is also to be apprehended, from the great impurity of that spirit, which would render any additional contamination less obvious to the palate. But when the liquid is deliberately examined, the presence of methylic spirit could not escape detection.

Strong alcohol of not more than 0.830 specific gravity should be employed as the basis of the methylated spirit. As the uniformity in quality of the wood-naphtha employed for mixing is important, it should be approved of by the Excise, and also added to the spirit under the inspection of an excise officer. It appears to us that it would be proper to mix the spirit in the distillery, and to declare illegal the possession of the methylated spirit by a rectifier or publican. The retail sale of the methylated spirit would then fall into the hands of oilmen and druggists, who would be supplied directly by the distiller, or through the agency of a wholesale druggist or drysalter.

Although it appears scarcely probable that the methylated spirit will ever find its way into public-houses, it is, nevertheless, desirable to possess means by which in cases of misapplication, the presence of wood-naphtha could be readily detected and proved in the suspected liquid. The methylated spirit which was operated upon, consisting of ninety measures of spirit of wine of density 0.828, mixed with ten measures of wood-spirit of density 0.815, and had a density of 0.823, as has been already stated, and boiled about 170°. When the methylated spirit was deprived of all water, by distillation from anhydrous sulphate of copper, it boiled at 169°. These temperatures are both very sensibly under 172.5°, the lowest temperature at which absolute alcohol or any mixture of pure alcohol and water can boil. The possession by a sample of spirit of a lower boiling point than the last, would indicate sophistication, particularly if the low boiling point was retained after rectification of the spirits from sulphate of copper, and the fact would suggest the existence of wood-naphtha in the spirits.

The attempt to identify wood-naphtha in spirits by means of chemical tests, must obviously be attended with great difficulties, for the very applicability of wood-naphtha for the purpose of producing an unpotable mixture which can be given to the public without fear of endangering the revenue, excludes the possibility of an easy separation of the two substances; and it may be at once stated that the experiments made with the view of finding an efficient chemical process for the identification of methylic spirit have been unsuccessful, and deserve to be noticed chiefly as affording additional illustrations of the safety of the mixture which is proposed. Fortunately methylic spirit, even when highly purified,* so as to become deprived of all the tarry and empyreumatic smell which it generally exhibits, possesses so characteristic and persistent an odour and taste that after a little experience it is not difficult to detect its existence, even when it is highly diluted or masked by the presence of other flavours.

Among the properties of the two alcohols on which possibly a separation might be founded, the different volatility of the two liquids at once suggested itself: absolute alcohol boiling at 173° Fah., whilst absolute methylic spirit boils at 143° Fah. In order to test this process half a gallon of the methylated spirit was submitted to distillation at a comparatively low temperature, and in an apparatus which allowed the less volatile liquid to condense. The first quart which passed

* By conversion into methyl-oxalate, decomposing this substance by ammonia, concentrating the reproduced spirit, and rectifying over anhydrous sulphate of copper, which retains also the ammonia.

over was again distilled, the first pint being collected apart, and so on, until at last one-sixteenth of the original bulk of the liquid was obtained as the most volatile portion. This liquid was repeatedly distilled over anhydrous sulphate of copper to remove any water which it might retain; it was found to boil between 168° and 169°, showing that the methylic spirit had been scarcely concentrated by this process. This fact, which at the first glance appears contrary to general experience, has been already explained; it is due, to a certain extent, to the difference of the vapour-densities of the two alcohols; for it is obvious that the smaller amount of alcohol-vapour, which forms during distillation on account of the higher boiling point of alcohol, must be compensated within certain limits by the greater weight this vapour possesses, when compared with that of an equal bulk of methylic spirit-vapour.

The isolation of the methylic spirit by a series of fractional distillations having proved impossible, the mixture was now boiled for several hours with dehydrated oxalic acid, in order to produce the oxalates of methyl and ethyl. The difference in the boiling point of the two ethers (363°—321°=42°) is not much greater than that which is observed with the alcohols from which they are derived. Oxalate of methyl being at the common temperature a solid crystalline substance, while oxalate of ethyl (true oxalic ether) is a liquid, it was hoped that the fractionation of the mixture of the two ethers might be more successful, and that by repeated distillation at last a product might be obtained in which the more volatile methyl-oxalic ether should predominate to such an extent as to crystallize. Experiment, however, showed that the presence even of a minute quantity of the former ether prevents the latter from assuming the solid form.

In studying the action of oxalic acid upon the methylic spirit it had been observed that if a smaller amount of oxalic acid be used than is necessary for the etherization of the entire quantity of the mixture, the methylic spirit appeared to be converted into ether with greater facility than the alcohol. Experiments were accordingly made with the view of isolating the methylic spirit by means of this reaction. The mixture was partially etherized by oxalic acid, and then submitted to distillation in order to separate the alcohol which had not been acted upon by the acid. The residuary liquid, consisting chiefly of methyl-oxalic ether, was decomposed by distillation with water. The reproduced spirit certainly contained a larger amount of methylic spirit than the original mixture; nevertheless the quantity of alcohol which it retained was so considerable that the advantages gained by the process did not appear to be in proportion to the amount of time and labour which its practice requires. A further concentration might be obtained by a repetition of the process; but this would render it so tedious and troublesome an operation as to preclude the possibility of using it as a routine test for the purpose of recognizing the presence of methylic spirit in a suspected liquid, although the process might be available for identifying and isolating that substance in cases of dispute.

Under the influence of oxidizing agents, methylic spirit furnishes, together with other products, a considerable amount of formic acid, whilst alcohol under these circumstances, yields principally acetic acid. Formic and acetic acids, although closely allied in composition and general characters, still offer a greater number of points of difference than the two alcohols which they represent. Formic acid may be readily distinguished from acetic acid by the facility with which the former precipitates the metals from the solutions of the more easily reducible metallic oxides, such as oxide of silver or oxide of mercury, which are not affected by acetic acid. Unfortunately, this method of testing became inapplicable, since it was found that alcohol free from methylic spirit when submitted to the action of oxydizing agents, invariably yields, in addition to aldehyde, which can be resinified and removed by potash, a small quantity of formic acid, so that the presence of formic acid, among the products of oxidation of a suspected liquid, cannot with certainty be regarded as an evidence of the existence of methylic spirit in the original liquid.

It is well known that ordinary alcohol when heated with an excess of concentrated sulphuric acid, furnishes in addition to sulphurous acid, a considerable amount of olefiant gas. Methylic spirit under the same circumstances, gives rise to the formation of a heavy oily liquid, which is insoluble in water, and consists chiefly of the neutral sulphate of methyl. The same liquid was obtained, together with olefiant gas and sulphurous acid, when the methylated spirit was distilled with eight or ten times its weight of concentrated sulphuric acid. But on careful examination, it was found that alcohol alone when submitted to similar treatment, yields likewise in addition to olefiant gas, the chief product of the reaction, a small quantity of oily products (heavy oil of wine, &c.), so that the production of an oily substance from a suspected liquid by the action of an excess of sulphuric acid, ceases to be an indication of the presence of methylic spirit in such liquid.

The action of sulphuric acid upon the two alcohols produces a very different result if the latter are in excess. Alcohol and methylic spirit under these circumstances exhibit the same deportment, the former yielding ether (common sulphuric ether), while the latter is converted into methyl-ether. It is however well known that the etherization of common alcohol proceeds with far greater ease than that of methylic spirit. Accordingly, the methylated spirit was submitted to the ordinary continuous etherization-process (ten parts of wood-spirit being successively exposed to one part of sulphuric acid). It was expected that after the evolution of the ether capable of being formed under these circumstances, the methylic spirit would remain behind as sulpho-methylic acid. But the residue, neutralized with lime and distilled with water, or with solution of potash, furnished no spirit, but an aqueous liquid in which no methylic spirit could be detected.

When anhydrous baryta is dissolved in dehydrated methylic spirit, a combination is formed, which crystallizes in lustrous needles, and consists of equal equivalents of methylic spirit and baryta. This substance was found to resist the action of water; even when boiled with water, it gave up no methylic spirit. It was possible that alcohol might differ in this respect; but although no crystals were observed, nevertheless a similar compound with analogous properties, appeared to be formed; a solution of anhydrous baryta in absolute alcohol, when distilled with water, yielding scarcely a trace of alcohol.

Lastly, a few experiments were made with the view of establishing the presence of methylic spirit in alcoholic mixtures by the dark yellowish-brown colour wood-spirit assumes when left for some time in contact with either solid hydrate of potash or soda. But it was found that the brown colour assumed by methylic spirit was only little more intense than that which alcohol shows when similarly treated. Moreover, it seems to be chiefly due to the impurities, the coloration becoming less and less marked, the greater the care bestowed upon the purification of the methylic spirit; the pure methylic spirit obtained by decomposing methyl-oxalic ether, showing, within a moderate time, no coloration whatever, either when left in contact in the cold, or when boiled with solid hydrate of potash or soda.

The principal uses to which spirit of wine is, or may be, applied, independently of its use as a beverage, appears to be the following:—

As a solvent of resinous substances, which, when thus dissolved, are used in the manufacture of hats, and otherwise as varnishes. As a solvent employed in the manufacture of many chemical preparations, including the alkaloids and other organic products, which are principally used in medicine. For the production of ether, chloroform, sweet spirit of nitre, and fulminating mercury. For burning in spirit-lamps as a source of heat, and for mixing with oil of turpentine or other hydrocarbons for burning in lamps as a source of light. As a solvent and menstruum for administering the active constituents of animal and vegetable substances used in medicine in the form of tincture, spirit,

&c. As a solvent of essential oils and other odorous substances used in perfumery.

1. Spirit of wine is largely used for dissolving the resins employed by hatters and varnish-makers.

In the manufacture of *hats*, shellac, dissolved either in spirit of wine or in impure methylic spirit (known as wood-naphtha), is used for giving stiffness and elasticity to the felt or other foundation of the hat, and for causing the adhesion of the nap. When wood-naphtha is used for this purpose, it is necessary to make a selection of those commercial samples which are found to be most suitable. Some varieties of wood-naphtha are imperfect solvents of the resins, and are therefore inapplicable for the purpose; but even among those samples which freely dissolve the resins there is much difference in quality, commercial methylic spirit being always a mixed and variable product, some of the constituents of which exert an injurious effect in the varnishes made with it. Spirit of wine is preferred to wood-naphtha for hat-making, being, in the state in which it is met with in commerce, more uniform in quality and less contaminated with foreign matters. Hatters state that when the felt has been stiffened with shellac dissolved in spirit of wine, the felt retains its elasticity after it has been dried and hardened without being much affected by atmospheric changes or exposure to wet, and it does not readily crack or break on being bent. But when the felt has been stiffened with shellac dissolved in naphtha, the hat, while it retains its stiffness, is liable to crack on being bent, and it readily loses its stiffness and elasticity when wetted or exposed to a damp atmosphere. Wood-naphtha is, therefore, used only on account of its low price, the quality of the hats in the manufacture of which it has been used being inferior to that of hats made with solution of shellac in spirit. In those instances in which, from competition in price, the hat-maker is obliged to use wood-naphtha, it is found necessary to use more shellac than would be required if spirit of wine were the solvent, in order to give the required stiffness and elasticity. The weight of the hat is thus increased, sometimes to the extent of several ounces, in order to compensate for the deteriorating effect produced by the naphtha. English hatters generally complain that they have to compete with foreign makers under a disadvantage, in consequence of the high price of spirit in this country.

In the manufacture of *spirit varnishes*, which are applied to other purposes than that of hat-making, both spirit of wine and naphtha are used for dissolving the resins. Among the varnishes of this description are included French-polish and lacquer, the consumption of which, as also of other spirit varnishes, is very great. Varnishes made with spirit of wine are considered to be better in quality than those made with naphtha. With regard to French-polish, those who are practically engaged in the use of this varnish say that when it is made with wood-naphtha it is not so easily worked, and does not afford so durable and serviceable a polish as that made with spirit of wine. The disagreeable smell evolved during the evaporation of the wood-naphtha is also objected to, especially when the polish has to be applied to furniture in private houses, or in the warehouses of upholsterers which are visited by customers. In the manufacture of lacquer for brass and other metals, and of other sorts of spirit varnish, there are also equally strong objections to the use of wood-naphtha as a substitute for spirit of wine. Hitherto the French have been considered to excel us in lacquered goods, which may no doubt be ascribed to the superiority of their lacquer, in the manufacture of which they always use spirit of wine for dissolving the resins. English manufacturers, on the other hand, notwithstanding the inferiority of lacquer and other varnishes made with wood-naphtha, use large quantities of that solvent, in proof of which an extensive varnish-maker informed us that his consumption of wood-naphtha was equal to that of spirit of wine. There is reason to believe that if spirit were supplied to manufacturers duty-free, the use of spirit varnishes would be greatly extended, and varnished ornamental woods would frequently be substituted for painted deal.

Among the purposes to which spirit varnishes would be more generally applied if spirit were cheaper, may be mentioned the manufacture of paper-hangings, and especially those in which imitation gold leaf ("leaf metal") is used, which, unless protected with varnish, soon become tarnished by the sulphuretted hydrogen always present in a town atmosphere. Not only for gilt papers, however, but for many others, and especially those used in staircases, would the application of a good spirit varnish be advantageous.

Another application of spirit varnish would be in the production of water-proof papers, to be used as wrapping-paper for steel goods, for the construction of envelopes for transmission by sea, for the manufacture of military cartridges, &c.

Among the productions of ornamental stationery, there is a class of paper, with embossed patterns, originally called Morocco paper, but which, on account of the variety of the patterns, now appear under the more general designation of varnished papers, which are very extensively used, especially for book-binding and for card-board box making; and in the production of these papers the English manufacturer is at present precluded, by the high price of spirit of wine, from the use of spirit varnish. It is admitted that this manufacture would be greatly improved by the employment of spirit varnish, as the papers when made, as at present, with oil varnish, are not adapted for exportation, on account of their liability to become heated and to adhere together.

In some of the applications of leather, the employment of spirit varnish would be a great advantage, especially in book-binding. At present its use is restricted by the high price of spirit to the better class of bound books, but its employment not only increases the beauty of the work, but serves to protect the leather, and there can be no doubt that, if spirit were cheaper, its use for this purpose would be greatly extended.

In the application of spirit of wine as a solvent of resinous substances for the purposes already referred to, it is not necessary that the spirit should be pure; but it is important that whatever foreign matter may be mixed with it shall volatilize without producing a very disagreeable odour, and that the resins shall be left, after the drying of the varnishes, unimpaired in quality and free from any offensive smell derived from the solvent.

There is reason to believe that a considerable quantity of illicit spirit is supplied to a certain class of hatters and varnish-makers, to the injury of the revenue and of the honest manufacturer. We are informed that this illicit spirit is sold for about 12*s*. per gallon, at 60 overproof.

As the employment of spirit for dissolving resinous substances appears to be the most extensive and important of its applications in the arts and manufactures, it was necessary to ascertain whether spirit mixed in the manner proposed in this report is applicable for such purposes. With the view of determining this point, experiments were made by ourselves, and were also kindly undertaken, at our request, by gentlemen practically engaged in the several departments of manufacture referred to. The results have fully satisfied us that the methylated spirit is suitable for all these applications. We are indebted for much valuable assistance, in reference to this part of our inquiry, to Messrs. J. T. and E. Christy and Co., and Messrs. Cooper, Box, and Co., hatters; to Mr. Rea and Mr. Heywood, varnish-makers; and to Mr. Warren De La Rue.

2. Spirit of wine is employed as a solvent in the manufacture of many chemical preparations, including the alkaloids and other organic products, which are principally used in medicine. In manufacturing the alkaloids derived from the cinchona barks, spirit is used in one part of the process. Indeed, alcohol appears to be the best and most general solvent for this class of substances. It is used in the manufacture of veratrine, and is required for crystallizing morphine, although this alkaloid may be prepared from opium without spirit. It has hitherto been the object of English manufacturers to discover processes for

the preparation of chemical products without the use of spirit, and such processes are sometimes adopted to the injury of the product. Spirit of wine may be advantageously used in the preparation of some inorganic salts, such as proto-sulphate of iron, which when precipitated from its aqueous solution by means of alcohol is less subject to change from exposure to the air than it is when crystallized in the usual way. The resinous constituents of jalap and scammony which are used in medicine are separated from the drugs by means of spirit of wine, and the use of this solvent might no doubt be greatly extended for similar purposes with advantage. In some cases the manufacture of chemical products has been lost to English manufacturers in consequence of the high price of alcohol or of ether which is made from alcohol. Thus pure tannin, the preparation of which involves the loss of a large quantity of ether, is imported from abroad at a price at which it cannot be produced at home. Among this class of productions, involving the use of spirit of wine as a solvent, may be mentioned transparent soap, a pure and elegant preparation for the toilet, which is much used in those countries in which alcohol is cheap, but which, from the high price of the solvent, is but rarely made and little used in this country.

For all the purposes here referred to the methylated spirit appears to be applicable. In addition to our own experiments we have been favoured with a statement of results obtained by Mr. T. N. R. Morson in the preparation of chemical products, and by Mr. Pears in the manufacture of transparent soap.

3. Spirit of wine is used as an ingredient for the production of ether, chloroform, sweet spirit of nitre, and fulminating mercury. These are important articles of manufacture, the first three being valuable medicinal agents, and the last-named being used for making percussion caps for fire-arms. Ether and chloroform are also made use of on account of their solvent power, especially the former. Sweet spirit of nitre is used exclusively in medicine, but being a popular remedy the quantity consumed is very considerable. We may state with reference to this article, that it is made by distilling a mixture of spirit of wine and nitric acid, and that when properly prepared it consists of a solution of a small quantity of nitrous ether in spirit of wine. The proportion of nitrous ether is extremely variable, and in some commercial samples is so small as merely to impart a slight flavour to the spirit, which flavour, moreover, is by no means disagreeable. From information derived from those practically acquainted with the commerce of this article, it may be inferred that a large proportion of the sweet spirit of nitre now used is made from illicit spirit, the price at which the wholesale dealer can purchase sweet spirit of nitre being less than that at which it can be produced with spirit on which the duty has been paid. It is scarcely to be expected that spirit which has been rendered permanently unpotable can be used for making sweet spirit of nitre, as the peculiar and unobjectionable flavour of that compound is the popular test of its good quality. When made with the methylated spirit, the compound acquires a disagreeable flavour, which is more especially developed on diluting it with water; and it is impossible to recover the alcohol again in a pure state from such sweet spirit of nitre. On the other hand, the separation of pure alcohol from good potable sweet spirit of nitre, such as the public are accustomed to use and require, is attended with no difficulty. It appears improbable, therefore, that any regulations could be devised for the preparation of sweet spirit of nitre from duty-free spirit, which could be adopted with safety to the revenue.

Ether and chloroform may be made with the methylated spirit, and when the products have been purified in the usual way, they do not appear upon a superficial examination to differ from those made with pure spirit. Upon allowing them slowly to evaporate, however, a peculiar and disagreeable odour becomes perceptible towards the end of the evaporation. This impurity would probably preclude their application for most medicinal purposes, for which they are required to be pure, or at least to be free from any foreign flavour either in taste or smell. When used as solvents, the same degree of purity is not

generally essential, and we believe that ether and chloroform produced from the mixed spirit are perfectly applicable for most manufacturing purposes.

Fulminating mercury is produced from mercury, nitric acid, and alcohol, and in consequence of the large quantity of alcohol consumed in the process, the price of the product is greatly influenced by the cost of this ingredient, so that the English manufacturer has found it difficult to compete with those who can command cheap spirit. We are informed that most of the fulminating mercury now used in this country is either made from illicit spirit, or is brought from the Channel Islands, where the low price of spirit offers an advantage to the manufacturer. The methylated spirit is applicable for this manufacture.

We have been aided in this part of our inquiry by the information kindly afforded us by Mr. Alfred White, Mr. Charles Davy, and Mr. F. Joyce.

4. A considerable quantity of spirit of wine is sold by retail dealers, chiefly Chemists and Druggists, for burning in lamps as a source of heat, including its application for singeing horses. It is also mixed with oil of turpentine or other hydrocarbons for burning in lamps as a source of light. The methylated spirit is quite suitable for such applications.

5. Spirit of wine is used as a solvent and menstruum for administering the active constituents of animal and vegetable substances used in medicine in the form of tincture, spirit, &c. These preparations being intended for the treatment of disease, and their efficacy frequently depending upon the association of substances, which from long experience have been found to contribute to the required result, the unauthorized introduction into their composition of a new substance, and especially one of so marked a character as methylic spirit, cannot in any way be sanctioned. There is a large number of pharmaceutical preparations of the sort here referred to, most of which are made according to formulæ given in the Pharmacopœias, a strict compliance with which is enjoined upon those who compound them. We cannot recommend the substitution of any mixture for the pure spirit directed to be used in making these preparations.

6. Spirit of wine is employed as a solvent of essential oils and other odorous substances used in perfumery, and it is scarcely necessary to say that the addition of anything to the spirit imparting to it an unpleasant odour must render it unfit for purposes of that description. The methylated spirit, therefore, cannot be used for the preparation of perfumes.

7. The employment of spirit of wine in the manufacture of acetic acid by the German process of oxidation has been suggested as a possible result of the entire removal of the duty on pure spirit, but this application could not obviously be made of a mixed spirit, such as has been contemplated in this inquiry.

8. The methylated spirit would serve for the preservation of objects of natural history, and also for the purposes generally to which alcohol is applied in chemical research. It would remove an impediment to the prosecution of science in this country, created by the high price of alcohol, which has long been complained of.

To recapitulate briefly the results of this inquiry—

It has appeared that means exist by which spirit of wine produced in the usual way, may be rendered unfit for human consumption as a beverage, without materially impairing it for the greater number of the more valuable purposes in the arts to which spirit is usually applied. To spirit of wine of not less strength than corresponds to density 0.830, it is proposed to make an addition of 10 per cent. of purified wood-naphtha, otherwise known as wood-spirit, pyroxylic spirit, and methylic spirit, and to issue this mixed spirit for consumption, duty free, under the name of *methylated spirit*. It has been shown that methylated spirit resists any process for its purification; the removal of the substance added to the spirit of wine being not only difficult, but to all appearance impossible; and further, that no danger is to be apprehended of the methylated spirit being ever

compounded so as to make it palatable. The privilege of using such mixed spirit should be open to all branches of the arts and manufactures without restriction; but it may be expedient to prevent the sale of the methylated spirit in licensed public-houses, or the preparation and sale of it by the licensed rectifiers of spirits. The wood-naphtha employed in mixing should be supplied by the Inland Revenue, in order to ensure uniformity in its quality, and that substance be mixed with the spirit at the distillery, under government inspection. The permission to use pure spirit of wine for any purpose of manufacture, under a bond of security, or in presence of a revenue officer, may reasonably be withheld till the methylated spirit now proposed has had a fair trial. It may be found safe to reduce eventually the proportion of the mixing ingredient to 5 per cent. or even a smaller proportion, although it has been recommended to begin with the larger proportion of 10 per cent. The present supply of wood-naphtha is amply sufficient for the application contemplated of that substance, for mixing with the spirits used in the arts and manufactures of the country.

The command of alcohol at a low price is sure to suggest a multitude of improved processes and of novel applications, which can be scarcely anticipated at the present moment. It will be felt far beyond the limited range of the trades now more immediately concerned in the consumption of spirits; like the repeal of the duty on salt it will at once most vitally affect the chemical arts, and cannot fail ultimately to exert a beneficial influence upon many branches of industry. The same measure also practically removes one of the last anomalies in the duties imposed for revenue, alcohol having, as a raw material of manufacture, a claim to exemption from duty according to sound principles of taxation.

[A Supplementary Report, in which the measure proposed to be adopted is slightly modified, was subsequently presented to the Chairman of Inland Revenue, and will be published in our next number.]

THE CINCHONA BARKS,

AND THE MORE IMPORTANT QUESTIONS WHICH, IN THE PRESENT STATE OF SCIENCE AND COMMERCE, RELATE TO THEM.

BY MM. DELONDRE AND BOUCHARDAT.

(*Continued from page* 517.)

The first description, in any degree complete, of the cinchona tree, is due to La Condamine. His work was printed in the memoirs of the Academy of Sciences for 1738. Joseph de Jussieu likewise visited the environs of Loxa in 1739.

It was not suspected at the time that La Condamine described the cinchona d'Uritusinga that it would afterwards be discovered to the north of the equator. The first indication of its existence there was due to Don Miquel de Santestevan in 1755, in the environs of Popayan. Humboldt, who read his account, thought that the discovery of Santestevan remained unnoticed among the papers of the viceroy. However, he sent specimens subsequently to Mutis, to whom it was reserved, says Humboldt, *to make known the botanical treasures of New Granada, and to give to the discovery of the cinchonas of that part of America all the importance which they merited.*

Mutis arrived in America in 1760; he made his first discoveries in 1772. Don Francisco Renquifo is likewise distinguished by the discovery of cinchonas in 1776, near Huanuco, and which were described by Ruiz and Pavon.

While Ruiz and Pavon were occupied in describing the Peruvian species, Mutis, assisted principally by Zéa, was working at the description of the cinchonas which grew on the other side of the equinoctial line in New Granada and the environs of Santa Fé de Bogota.

Linnæus gave the name *officinalis* to the cinchona described by La Condamine; afterwards he designated by the same name, the species, a new specimen of which he received from Mutis.

Vahl has designated this species by the name *macrocarpa*, but it has since been

recognized as the *C. ovalifolia* of Mutis, or the *C. pubescens*. Thus, since the year 1767 the name *officinalis* has been applied to *C. Condaminea*, *C. macrocarpa*, *C. pubescens;* and Ruiz, in his *Quinologia*, has given the same name to *C. nitida* of the *Flore du Pérou.*

It is the same even at the present time with all the cinchona barks. Every one has attempted to give a particular name, and in consequence of so much discussion as to the determination of species, such confusion has been produced that the authors consider analysis alone is competent to do away with it, by presenting the barks with the name of the province from which they are derived, and with their therapeutic value. They insist, moreover, and they have endeavoured to produce a practical, rather than a scientific work.

Up to 1820 the Loxa bark and the orange bark of Mutis were the two species most esteemed, but the former was preferred by the Spanish physicians, notwithstanding the authority of Mutis.

The discovery of the cinchonas of New Granada and of Peru gave rise to opinions respecting the medicinal virtues of these barks, which were founded less upon medical experience than upon mercantile interest.

The commercial houses of Spain, which had for half a century possessed a monopoly of the cinchona bark of Loxa, endeavoured, says Humboldt, to depreciate that of New Granada. They found acquiescent botanists who, by elevating varieties to the rank of species, proved that the cinchonas of Peru were specifically different from those which grow round Santa Fé. When the commerce of the bark of the cinchonas of Humalies and Huanuco, vaunted by Ortego, Ruiz, Pavon, and Tafalla, fell into the hands of those who had formerly carried on the trade in Loxa bark, the new barks from Peru found a more easy access into Europe than those of Santa Fé; but these latter, which the English and Americans were able to procure more readily from Carthagena, obtained a great celebrity in England, Germany, and Italy. The influence of mercantile intrigues was carried so far that at Cadiz a quantity of the best orange bark collected by Mutis at the expense of the king was ordered to be burnt, while in all the military hospitals of Spain there was the greatest scarcity of the precious drug. *A part of this bark, destined to be burnt, was secretly bought at Cadiz by English merchants, and sold in London at a very high price.*

These are the remarks of Humboldt, and who would think that forty years afterwards similar practices would be repeated in another form, and that they would have had the same results for the barks of New Granada, if their richness in alkaloids had not been brought forward as a defence?

The authors quote the following passages from the biography of Mutis, written by Humboldt, in the *Biographie Universelle*, 1821:—

"Don Jose Celestino Mutis was born at Cadiz, in 1732—Linnæus called him *Phitologorum Americanorum Princeps;* and likewise *nomen immortale quod nulla ætas unguam delibit.* It is to him that we are indebted for the discovery of cinchonas, in countries where their existence was not expected. The beneficent influence which he has exercised upon civilization and the progress of enlightenment in the Spanish colonies will ensure him a distinguished position among the men who rendered the New World famous: he laboured without ceasing for forty years."

In 1808 MM. Humboldt and Bonpland stayed for a time at Santa Fé de Bogota with Mutis, who showed them all his collections and drawings; up to the time of his death (September 2nd, 1808) he continued to accumulate materials for his researches without being able to fix upon a settled plan as to the mode of publication which he should adopt.

During the war of independence, which took place soon after his death, the pupils who surrounded him, and the depositaries of his manuscripts and collections, perished. The greater part of his writings have been lost, as well as the results of his indefatigable labours.

He was not known in Europe, except by the communications which he made in his correspondence with Linnæus, who appreciated the greatness of his genius in the terms already quoted.

It seems important likewise to make known some fragments of the necrological article, published by Caldas in the *Semanario de la Nueva Grenada*, and which has as the motto—

"*Finis vitæ ejus, nobis lutuosus, patriæ tristis, extraneis etiam, ignotisque non sine curâ fuit.*" TACITI, Vit. Agric.

"On the 2nd September, 1808, Dr. Don José Celestino Mutis died in this capital!* How great a loss for science, the country, and virtue! . . . . This great man was born at Cadiz, on the 6th of April, 1732, of honourable and virtuous parents. . . . . In 1760 he disembarked at Carthagena. . . . . Scarcely arrived in the mountains of New Granada he commenced describing the plants in which he took such interest. . . . . It was then that he commenced his correspondence with the immortal Linnæus and other naturalists in Europe; he sent them collections and drawings which were deserving of the most flattering praise. . . . . We may affirm that *no man was ever better acquainted with the genus cinchona.* In 1772 he discovered one of these precious trees in the mountains of Tena, about six leagues from the capital.

". . . . . Envy and rivalry may deceive the public as to the true author of this important discovery; but we who have had the happiness of seeing undoubted proof of the fact, and to be informed of it by Mutis himself, cannot but admire the resignation and modesty of this worthy man. The time is come for his family to enlighten the public and to furnish triumphant proof of his discovery, in order to impose silence upon his enemies. The respect that we owe to our chief, and the command which he gave us to be silent, has compelled us to maintain a sorrowful silence. But in a work which we are preparing we shall confound those who are envious of his distinction, and the rivals of Mutis will repent more than once their injuries of this peaceable and Christian naturalist. He had scarcely assured himself of the legitimacy of the species of cinchona which he had discovered than he employed himself in searching for others; he did not even stop there; the virtues of each species attracted his attention, he studied their application in medicine, and has left us the most valuable discoveries for the re-establishment of our health. . . . . Reposing in the testimony of his conscience and on seventy-seven years passed worthily, he reached his end with tranquillity. . . . . Great soul of our chief, receive this great testimony of love and of respect."

In the unpublished writings of Caldas, the editor of the new edition of the *Semanario de la Neuva Grenada* felt himself bound to publish a private application, which was addressed by Caldas to the secretary of the Viceroy, and "*juge chargé des affaires*" of the botanical expedition at Santa Fé, of which Mutis was the chief, and who had attacked Caldas in 1802. This application was found among the papers of the Viceroy, and was not intended to become public, for it was dated the 30th of September, 1818, that is twenty-eight days after the death of Mutis, and was, consequently, written almost at the same time as the article from which the above quotation is taken.

It is painful to dwell, even for a moment, upon the eulogy which Caldas lavished upon Mutis, and upon the injuries which he committed *in private* against the memory

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* Santa-Fé de Bogota.

El dia de Setiembre, murio en esta capital el Doctor José Celestino Mutis, que perdida para las ciencias, para la patria y para la virtud! . . . Este hombre grande nació en Cadiz el 6 de Abril, 1732, de unos padres honrados y virtuosos. . . . En 1760, desembarco en Cartagena. . . . Apenas piso las costas de la Nueva-Grenada, comenzo á colectar y á describir sus amadas plantas.

Entonces estableció su correspondancia con el immortal Linneo, y con otros sabios de la Europa, entonces remitió collecciones y disenos que la merecieron los elogios mas lisonjeros. . . . Podemos afirmar que ningun mortal conocido mejor el genero cinchona. En 1772, descubrio una de estas plantas preciosas en el monte de Tena, á seis leguas de esta capital.

La envidia, la rivalidad podran fascinar á los incantos y al publico, sobre el verdadero autor de este importante descubrimient; peró su familia, los que hemos tenida la dicha de oirle y de ver las pruebas irrefragables en que apoya la verdad de este echo, no podemos dejar de admirar la modestia y el sufrimiento de este hombre virtuoso. Peró y allego el tiempo de que su familia desengane al publico, de que presente las pruebas victoriosas, y haga callar á sus enemigos. El respecto que debiamos á nuestro director, el precepto que teniamos de callar, nos ha mantenido en un silenzio forzado y doloroso. En un escrito que preparamos, se disenganaron los envidiosos de su gloria y los rivales del nombre de Mutis, se arrepentiran mas de una vez, de haber lanzado tantas injurias contra este sabio pacifico y cristiano.

Apenas se aseguro de la legitimidad de la especie que habia hallado, comenzo á solicitar otras. No paró aqui; las virtudes de cada una le llamaron toda su atencion. Como medico las aplico y nos ha dejado os mas preciosas descubrimientos para restablecer nuestra salud.

. . . Descansando sobre el testimonio de su conciencia, y sobre 77 anos de virtud, vió llegar su fin con tranquilidad. . . . Alma grande de nuestro director, recibe este primer testimonio de respecto y de amor!

of the chief whose modesty and learning he had publicly proclaimed by promising to confound his detractors. It will suffice to copy the sad conclusion of this application.

" . . . I conclude my narrative already too long . . . and I request to be entrusted with the preservation and continuance of the work of the astronomical observatory, *with a moderate salary sufficient for my subsistence.*"*

In short, Mutis, after his death, was slandered only by Caldas with the object of procuring a place and money, with the reversion of the mémoirs of that naturalist.

Recently *apropos* of a bad kind of bark to which it was intended to give the name of *Cinchona nova*, and which is among the collection of the Museum or of some other, under the name of Mutis' Red Cinchona. It has been attempted to attribute to him this blunder, which belongs solely to those who have mischosen or misnamed it.

Who will credit that he who has been called by Ruiz *tan sabio medico*, and whose observations on the treatment of fever by every kind of cinchona he states himself to have been confidentially acquainted with, would have been deceived for more than thirty years, as to the properties of any inert bark, when he had at his disposal a well characterised species which grew in the midst of the others, and whose beneficent action in certain fevers he had noticed.

About three years since, a merchant at Bogota committed the same error, which cost him dearly ; he exported to MM. Bergès and Co. of Havre, two hundred serons of this false bark, which was abandoned at the custom-house, and publicly burnt. The same merchant has since ascertained his mistake, and has exported several hundred serons of the true red bark of Mutis, and when sending specimens of this bark to the author, granted that he was strangely deceived in the forest by taking one for the other, and that he recognised the accuracy of our observations.

MM. Quesnel and Co. of Havre, likewise received a large quantity of bark, very nearly the same, collected in the Argentine republic, and transmitted by way of Buenos Ayres. This bark was also burnt publicly, and the authors are indebted to MM. Quesnel for specimens of it, which are added to those destined for the Faculté de Médecine.

Another parcel sent from the interior of Brazil by way of Rio Janeiro to MM. Léon Lecomte and Co., serves only to complete the collection of false barks which it is useful to be acquainted with, so that in future they may not be confounded with real cinchona.

At the present time the cinchona is known all along the chain of the Andes, or an extent of more than 700 leagues, from La Pax and Chuquisaca (Bolivia) as far as the mountains of Sainte-Marthe and Mérida (New Granada).†

In the classification of the drawings, the authors have followed the magnificent map by M. Weddell, placed at the end of his *Histoire Naturelle des Quinquinas*, and which he has allowed them to publish with their plates.

Ruiz complained bitterly in 1792 how little care the *cascarilleros* took in the collection of the bark. M. de Jussieu, in his learned report on the *Histoire Naturelle des Quinquinas*, by M. Weddell, likewise confirms the observations contained in that work, in reference to the loss of a very large portion of the bark. Now that all the republican states of South America have only to make a wise use of the independence they have so dearly bought, there can be no doubt that the governments of Bolivia, Peru, and New Granada, will turn their attention to the conservation of one of the greatest sources of wealth in those fine countries, by regulating the cutting of the trees by law.

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* Senor secretario del vircinato, y juez comisionado, para los asuntos de la expedicion botanica de Santa-Fé.

. . . Yo concluido mi relato, ya demasiado largo. . . yo me ofrezco, al mismo tiempo, á mantener el decoro, y los trabajos del observatorio astronomico con un moderado, pero regular sueldo para mi subsistancia.

Santa-Fé, 7 Setiembre 30, 1808. FRANCISCO-JOSE DE CALDAS.

† The authors are of opinion that it is the orange cinchona which, according to the *Géographie des Plantes Equinoxiales* of Humboldt and Bonpland, occurs at the superior limit of the cinchona district 2900 metres above the level of the sea; and suggest as probable that he met with the red cinchona at the same elevation that it occupies in the forests of Quito, where the red bark was known at an earlier period, which was long esteemed in medicine, and which presents such a great analogy with that of Mutis. The inferior limit of the cinchonas is 700 metres above the sea-level.

Ruiz likewise remarks, with reason, that the *coca*, which forms impenetrable forests, had finally been cultivated with great care, and that the culture has improved the quality and increased the quantity of the produce. It is strange that the same care should not be taken with the cinchona trees, so as to preserve them for future generations, instead of abandoning them to the indifference of the Indians, who destroy them year by year, by the manner in which they collect the bark.

The idea of acclimatizing the cinchona in other countries has frequently been entertained, but unfortunately this appears to be attended with great difficulty, for the nature of the soil upon which the forests grow in the neighbourhood of the Andes chain is almost peculiar to that locality. It would, therefore, be much easier to conduct the collection of the bark in such a manner as not to cause so great a loss, and so as to facilitate its reproduction.—*Répertoire de Pharmacie*, 1853.

ON THE VALUE OF STEAM IN THE DECOMPOSITION OF NEUTRAL FATTY BODIES.

BY GEORGE WILSON, ESQ.

In the course of a long series of experiments conducted on a large scale, the author has observed that the so-called neutral fatty bodies may be resolved, without danger of injurious decomposition, into glycerine and fatty acids, provided the still is maintained at a uniform high temperature, and that a continuous current of steam is admitted into it.

The temperature required to effect the splitting of the fats into their proximate elements varies with the nature of the body itself, but all hitherto tried may be resolved into glycerine and fatty acid at a temperature of 560° Fahr., many at much below that temperature. At a future period it is the author's intention to lay before the Society a detailed account of his experiments, with the confirmatory analyses, but in the mean time he states that palm oil, cocoa-nut oil, fish oil, animal tallow, Bornean vegetable tallow, "Japan vegetable wax" (more properly tallow), and several others have yielded satisfactory results, the fatty acid and glycerine distilling over together, but no longer in combination, and separating in the receiving vessel.—*Proceedings of the Royal Society*, vol. vii., No. 7, 182.

PREPARATION OF PURE CARBONATE OF POTASH.

Notwithstanding the advantage there would be in using a mixture of nitrate of potash with bitartrate, for the preparation of pure carbonate, on account of the price of the latter, a prejudice exists against this process, on account of a general statement in chemical works, that cyanide of potassium is formed from the nitrogen of the nitrate.

Engelhardt* has found, however, that cyanide of potassium is not produced in this operation; and he also points out, that if it were present in small amount in the ignited substance, it would be entirely decomposed during the subsequent operation of solution and evaporation to dryness; first, into ammonia and formate of potash; and, lastly, into carbonate of potash.

To render more certain the decomposition of any cyanide, Engelhardt sprinkled the red hot residue of the deflagration with water; and he observed that this treatment produced so large an evolution of ammonia, that it might have been inferred thence that the amount of cyanide was considerable. However, cyanide could not be detected by reagents.

Subsequently Wicke † has confirmed the above statements, and he has found that the evolution of ammonia is owing to the presence, in the deflagrated mass, of cyanate of potash, which he extracted with alcohol and obtained in crystals. This salt is decomposed, when the hot mass is sprinkled with water, into carbonate of potash and ammonia.

This mode of preparing carbonate of potash is therefore wholly unobjectionable. Wicke recommends the use of one part nitrate of potash and two parts bitartrate.

* *Neues Jahrbuch für Pharmacie*, September, 1854.
† *Annalen der Chemie und Pharmacie*, April, 1855.

PREPARATION OF *FERRUM PULVERATUM.*

BY WÖHLER.

Medical experience has shown that metallic iron, in a finely divided state, is more efficient than any of the compounds of this metal which have been used. Formerly mechanically powdered bar iron was employed under the name of *ferrum pulveratum*, until in 1840 Quevenne and Miquelard † proposed to obtain it by reducing the oxide by hydrogen. Iron obtained in this manner perfectly pure, appears to have essential advantages over the ordinary, less soluble and carbonaceous bar-iron powder. It is now generally used in France under the name of *fer reduit.*

The mode of preparation is very easy, and may be conducted by any Druggist. The most troublesome part is the preparation of pure oxide of iron, if this is done by precipitation by ammonia. It is better to adopt the following process, recommended by Faraday, for the preparation of polishing powder :—Pure crystals of sulphate of iron are heated in an iron pan until perfectly dehydrated, the powder mixed with twice or three times its weight of pure dry chloride of sodium, introduced into a clay crucible, and heated to redness until it melts. When the melted mass is cold, it is washed with water, and the oxide of iron remains as a crystalline powder of blackish-red colour.

The oxide of iron thus obtained is reduced by ignition to redness in a current of dry hydrogen, either in a glass tube or gun barrel. The gas is generated from iron and sulphuric acid, and care must be taken that the latter is not arsenical. The gas is dried either by sulphuric acid or chloride of calcium, introduced between the generator and the tube containing the oxide.

As soon as atmospheric air is displaced from the apparatus, the tube is heated to full redness, and the temperature and current of hydrogen maintained so long as the formation of water is observed at the open end of the tube. When this is at an end, the tube is removed from the fire, closed at each end, and when cold the reduced iron transferred to a bottle. Care must be taken to prevent access of air to the reduced iron while hot, as it is highly pyrophoric in this state. The reduced iron thus prepared should not appear black in places, which would show that the reduction was imperfect. It should consist of small grey lamelar crystals, of the same form as the oxide of iron. These crystals are porous pseudomorphs, and may therefore be reduced to very fine powder with ease.

When well prepared, the *ferrum pulveratum* should be a light grey powder without lustre. When pressed with a polished substance, it acquires metallic lustre. When heated, it readily burns. It should be perfectly soluble in dilute sulphuric acid with evolution of hydrogen.—*Annalen der Chemie und Pharmacie*, April, 1855.

PRESENCE OF LEAD IN COMMERCIAL HYDROCHLORIC ACID.

Hainault‡ has observed that hydrochloric acid, when neutralized, gave a copious white precipitate, which, dissolved in nitric acid, gave with iodide of potassium a yellow precipitate of iodide of lead. This chloride of lead most probably originated from the leaden vessels used in the preparation of the acid.

HOMŒOPATHY.

TO THE EDITOR OF THE PHARMACEUTICAT JOURNAL.

Sir,—A Member of the *Pharmaceutical Society* and a subscriber to the *Journal*, I beg to protest, in the name of truth and good feeling, against the matter and tone of your observations on homœopathy in the last number.

To quote from yourself—" According to the fundamental doctrine of Hahnemann, ' *similia similibus curantur*,' the appropriate remedy for the cure of a disease is that which would produce a similar disease, or similar symptoms, if taken by a person in a state of health;"—and then you go on to say, that on this principle gunshot wounds

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† *Mémoire sur l'Action Physiologique et Thérapeutique des Ferrugineux.* Par Quevenne, in the *Archives de Physiologie*, sous la direction de Bouchardat. No. 2, October, 1854.

‡ *Journ. de Pharmacie d'Anvers*, February, 1854.

must be treated with an infinitesimal dose of *plumbum;* a sword cut, by *ferrum;* scurvy, by *salt pork*, and so on." You have here confounded mechanical injuries and the results of the absence of certain constituents from the food with disease; violent disruption of the substance of the organism and a sort of starvation, with dynamic alterations in the action of the life-principle.

The principle on which you have in this instance proceeded would lead you, in writing an account of the Jews, to describe circumcision as a disease to which all their male infants were subject on the eighth day of their lives; or to recommend your countrymen to meet a foreign invasion by an appeal to the common law. You would try an invading army in the Court of Queen's Bench, and move for a writ of ejectment against them, when in possession of the Cinque Ports. Your principle would prevent the extraction of a bullet by a writ of habeas corpus, and naturalize a foreign body to deal with it according to the laws of the realm.

Scurvy is the result of a sort of starvation, from the absence of vegetable acids in diet. The proper way to meet it is to supply the lacking constituents. To treat it homœopathically would be like recommending a nation to meet famine by process of law.

Are you aware that the examination of Dr. Galloway's globules was conducted by a rival practitioner, and not by a professional Chemist, and this without notice to Dr. Galloway? That an error in analysis might, therefore, easily have happened? That Dr. Galloway did not administer *bichloride of mercury* (the preparation said to be detected) but the *protoxide*? That a professed Chemist and unprejudiced man could detect no mercury at all in the globules that had come out of the same bottle with those administered to the patient? That gangrenous mouth, in thirty-two recorded cases, occurred after measles in fourteen? and that, out of twenty-one recorded results, twenty were fatal? How likely, then, that Dr. Galloway's case was one of gangrenous mouth, arising in the natural course of disease; and what wonder it terminated in death, seeing the chances were twenty to one against recovery.

Dr. Galloway, it is evident from these facts, has been treated very unfairly.

I may add, before leaving this part of the subject, that the *anemone pulsatilla* has been found to produce in the healthy subject an eruption similar to that of measles, with catarrhal symptoms.

A homœopathist is at perfect liberty to administer whatever dose he thinks will act best, without forfeiting his claim to be called a homœopathist. The term refers to the *principle of treatment* on which he acts, not to the dose he uses. It is notorious, however, that he uses much smaller doses than the allopathist, as is evident from the fact, that as soon as the former begins to use anything like the doses the latter does, the cry of poison is raised by the very men who use larger doses themselves.

The community have discovered that under the homœopathic system no teeth drop out, and no constitutions are broken up by the means used; and in spite of the cry of "sugar-plums, nothing but sugar-plums," inflammation is arrested, and cholera a much more manageable disease than under any other system.

I have, Sir, penned these remarks from a love of truth and justice, and ask for their insertion in your journal in the belief that you have an equal love of these virtues yourself, and that you will be ready to pay the proper homage to them, as soon as you have found that want of consideration and of information have led you inadvertently to sin against them.

I am, Sir, your obedient servant,

Newcastle-on-Tyne, May 15th, 1855. JOHN MAWSON.

[Homœopaths usually repel the "*argumentum ad absurdum*" by repudiating that part of their system to which it owes its popularity. To them belongs the exclusive right and privilege of talking nonsense, and they expect their patients to swallow (with the globules) the entire doctrines of Hahnemann. The homœopathic dose is the attraction (the term being understood to mean a dose infinitisimally small), but the dose administered is either small or large, according to the whim of the practitioner. It is not the cry of "poison," which is raised when homœopaths deviate in practice from the principles they profess, but "imposition." They are rarely accused or suspected of doing positive mischief, but they delude patients with sugar-plums, and thus prevent them from obtaining efficient medical treatment.—ED.]

DEATH FROM BICHLORIDE OF MERCURY, TAKEN BY MISTAKE.

(Communicated by Mr. Joseph Leay, M.P.S.)

Sir,—At page 526 of your number for this month (May) a case is given in which an *apprentice* is acquitted, who had caused the death of a patient by a mistake in preparing a prescription.

I have annexed to this letter the newspaper report of a case, in which an *assistant* is found guilty under similar circumstances.

As it so happened that I was foreman of the jury at the trial of James Town, and as I do not shrink from any comments on the verdict, I will add a few particulars, from memoranda taken by myself at the time of the trial, which took place at the Warwickshire Lent Assizes, in the Crown Court, Warwick, on Tuesday, March 27, 1855, Mr. Justice Coleridge presiding.

The prisoner was a respectable young man in appearance, and evidently felt his position acutely. His defence is correctly given in the report annexed. He employed no counsel ; his defence was made in very few words.

"*James Town*, a druggist's assistant, was charged with the manslaughter of Elizabeth Compton, of Coventry. This case, owing to the respectability of the friends of the deceased, excited a good deal of interest, and the court was densely crowded during the trial of the prisoner.—Mr. Spooner prosecuted, and stated the case as follows :—The prisoner was an assistant in the shop of Mr. Jenkins, chemist, of Coventry, and the deceased a relative of a family of respectability, named Spencer, residing in that city. It appeared that the deceased was suffering from ulceration in the throat, and Dr. Hughes attended her, and prescribed medicine for the complaint. The prescription was sent to the shop of Mr. Jenkins, when the prisoner made up a bottle of medicine, and a dose was administered to the patient. Shortly afterwards she was seized with pains and vomiting, and in a few days death resulted. The bottle of medicine was taken to Mr. Jenkins, who at once discovered that bichloride of mercury had been put into the mixture instead of chlorate of potash. There was but little difference in the appearance of the two articles, but the former was easily distinguished by the size and weight of the crystal, as compared with the latter. As a guard against accident, they were placed in different parts of the shop, but without that precaution a skilful person would at once be able to select the one from the other.—The prisoner, when called on for his defence, said the mistake had been purely accidental. He had only been in Mr. Jenkins's service a fortnight, and the label of the bottle was turned inwards when he reached it to prepare the mixture, and he firmly believed it to be chlorate of potash."

The witnesses in the case were as follows:—

1st. The apprentice to Thomas Jenkins, who copied the prescription *after the prisoner had made it up*. This witness said, the prisoner had undertaken the dispensing of the prescription voluntarily, remarking that he had nothing in hand at the time.

2nd. Frederick Needham, the errand-boy, who took the medicine to Mrs. David Spencer's.

3rd. Mrs. Tabitha Spencer, who gave a dose of the medicine to her niece, Elizabeth Compton (a child), who was immediately taken much worse. She perceived that a mistake must have happened, and sent for the doctor.

4th. Thomas Jenkins, chemist. The prisoner was his assistant. Prisoner had only been with him a short time; he had received an excellent character with him.

The prescription in question was written by Dr. Hughes, and was as follows:—

℞—Potassæ Chloratis, ℥iss.
Syrup Aurantii, ℥ss.
Aquæ ad ℥vj. ℿ.
Capiat sextam partem.

The shop bottle, containing the hydrarg-bichlorid was labelled "Hydrarg Oxymuriat," and was substituted for the potass chlorat by prisoner.

Another female relative of deceased appeared as witness; and also Dr. Hughes, the medical man who had prescribed the medicine, and who stated the cause of death to be the corrosive sublimate, administered by mistake.

The verdict was "*Guilty of negligence*," which amounted to a verdict of manslaughter, as the jury *well knew*.

The prisoner was sentenced to six months' imprisonment, *with hard labour ;* but the judge almost immediately recalled him, and altered the sentence to six months' imprisonment in the common gaol, without hard labour.

BOOKS RECEIVED.

A System of Instruction in Qualitative Chemical Analysis. By Dr. C. Remigius Fresenius, Professor of Chemistry and Natural Philosophy, Wiesbaden. Fourth Edition. Edited by J. Lloyd Bullock, F.C.S. London: John Churchill, New Burlington Street. 1855.

The Pocket Formulary, *and Synopsis of the British and Foreign Pharmacopœias; comprising standard and approved Formulæ for the Preparations and Compounds employed in Medical Practice.* By Henry Beasley. Sixth Edition, corrected, enlarged, and adapted to the last editions of the Pharmacopœias. London: John Churchill, New Burlington Street. 1855.

On the Application of Chemistry to the Preservation of Food. By the Rev. John Barlow, M.A., F.R.S., Vice-President and Secretary, R.I.

TO CORRESPONDENTS.

"*Pharmacopœia.*"—(1.) *Unguentum Calcis Hydrargyri Albi* is the name given to White Precipitate Ointment of the London Pharmacopœia of 1788.—(2.) *Unguentum Hydrargyri Colatum* is made by liquifying, and then straining the Unguentum Hydrargyri Fortius. It is considered by Mr. Startin, who prescribes it, quite as efficacious and a more elegant preparation.—(3.) See page 290 of this volume.

H. H.—*Acidum Nitro-hydrochloricum Dilutum.* There is no authorized formula. It is sometimes made by mixing equal parts of the two dilute acids.

"*Gulielmus*" (Bury St. Edmunds).—Lindley's Vegetable Kingdom or Balfour's Manual of Botany.——*T. S. C.* (Poplar).—*Pot Pourri.* Vol. iv., page 339.

C. H. (Birmingham).—(1.) Electricity and Magnetism are generally considered to be agents, not elements.—(2.) Carburetted Hydrogen.—(3.) By application to the Secretary, 17, Bloomsbury Square, and payment of the carriage, books may be had from the library.

Inquirer (Exeter).—*Tinctura Sinapis.* Our correspondent should apply to Mr. W. Hearder, Torquay, who is the proprietor of the above preparation.

A Student (Tavistock).—(1.) Royle's Manual of Materia Medica.—(2.) The Lard should be pure.—(3.) Hoblyn's Dictionary of Medical Terms.

W. T. R. (Denbigh).—*Tinctura Arnicæ* as a lotion is often used in the proportion of an ounce of the tincture to a pint of water.

A Member.—We have no formula for Ferri sulphas cum Quinâ.

A Knight (Cirencester) expresses a hope that the next Pharmacopœia will contain many new formulæ, and that the Profession will discourage secret preparations. He encloses a formula for Liquor Opii Sedativus, which we shall refer to the Pharmacopœia Committee.

A Constant Subscriber.—(1.) Of any bookseller, price 3s.—(2.) Robinson on the Teeth is out of print.

Mr. Jenkins.—Horse and Cattle Medicines are not liable to stamp duty.

Z.—The preparation "*Gelée pour le Goitre*" is liable to stamp duty. The law recognises no distinction between a recommendation in French and in English.

V. X.—We have no means of answering the question about Canada.

J. M. (Pembroke Dock).—A Scotch M.D. cannot legally practise in England without a license from the College of Physicians of England.

R. J. A. (Liverpool).—To obtain a situation, first pass the examination, and then apply to some of the wholesale or retail houses.

A Correspondent (Taunton).—*Celsus* was answered by post, but the letter has been returned; the name being illegible.

Mr. J. Dixon's letter received too late for insertion this month.

A specimen of handbill, as circulated in Bristol by a Member of the Pharmaceutical Society, has been received.

J. M. (*M. P. S.*)—We are unable to supply the information required.

Quæsiter.—(1). See vol. xii., page 374, of this Journal.—(2). See vol. xi., page 214.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

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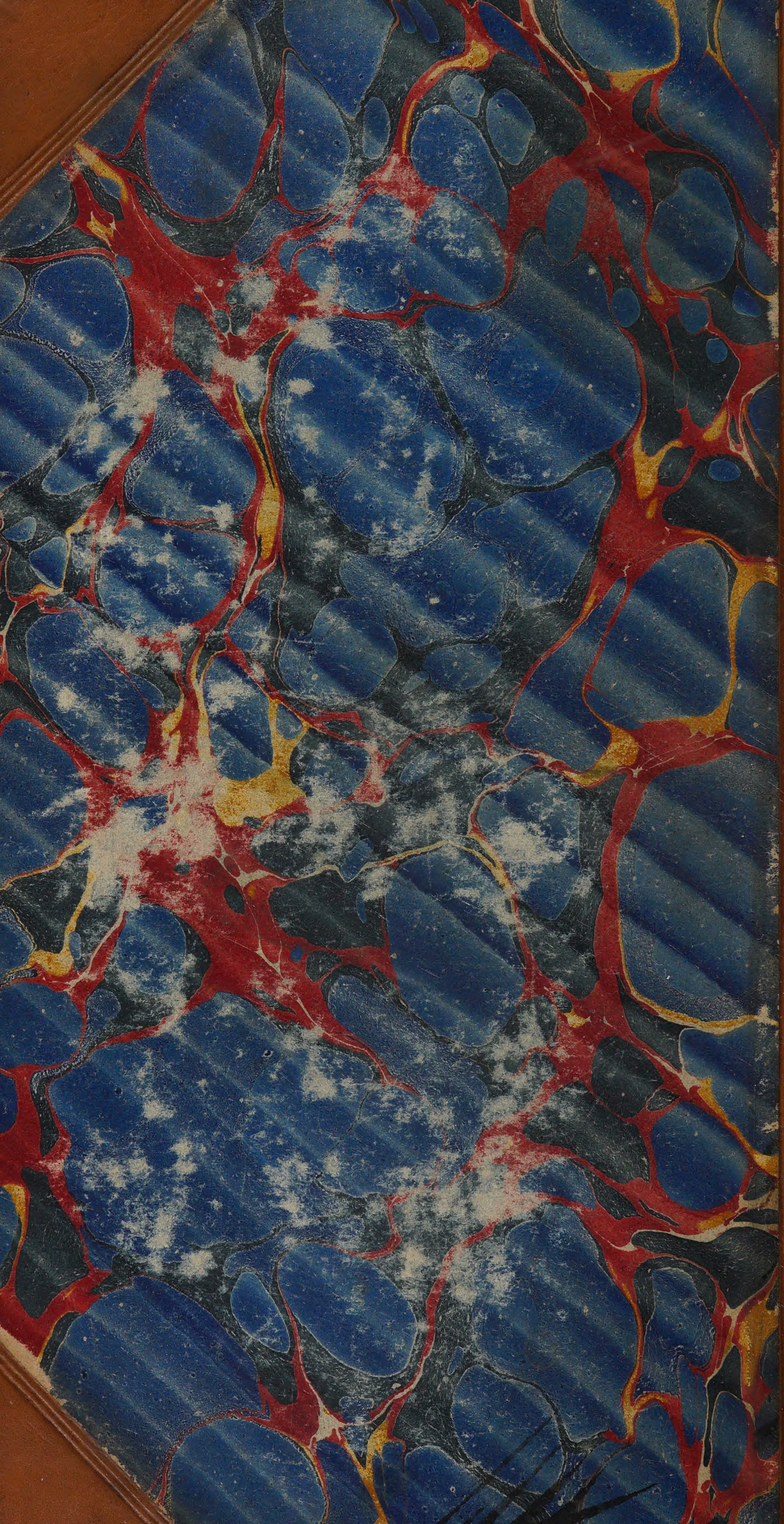
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